DECLARATION

I, Jun HAYASHI of c/o The Patent Corporate Body ARUGA PATENT OFFICE, 1-3-6, Nihonbashi Ningyocho, Chuo-ku, Tokyo 103-0013 Japan do solemnly and sincerely declare that I well understand both Japanese and English languages and that I believe the attached English version is true and complete translation of Japanese patent application No. 2002-375321 filed on December 25, 2002 in the name of Kao Corporation.

December 17, 2007

Jun HAYASHI

[Designation of Document] Specification

[Title of the Invention] Hair cosmetic composition

[Claims]

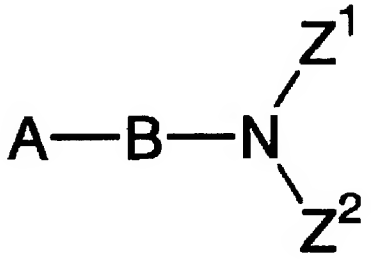
[Claim 1]

A hair cosmetic composition comprising the following components (A) and (B):

(A) an amphipathic amide lipid,

(B) a tertiary amine type compound represented by the following formula (N):

[Chemical formula 1]



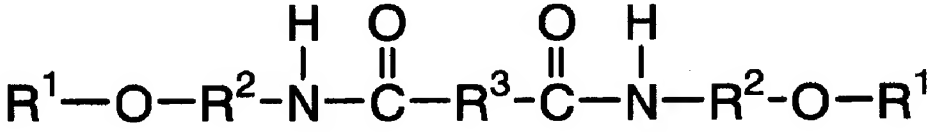
(N)

[wherein, A represents a hydrogen atom or a linear or branched, saturated or unsaturated amide, (N-hydrocarbon)carbamoyl, acyloxy or hydrocarbonoxy group each having 12 to 24 carbon atoms in total, B represents a linear or branched, saturated or unsaturated divalent C_{1-22} hydrocarbon group, and Z^1 and Z^2 each independently represents a C_{1-4} alkyl group] or a salt of the compound; and having a pH of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[Claim 2]

The hair cosmetic composition of Claim 1, wherein Component (A) is an amphipathic amide lipid selected from compounds represented by the following formulas (1) to (4):

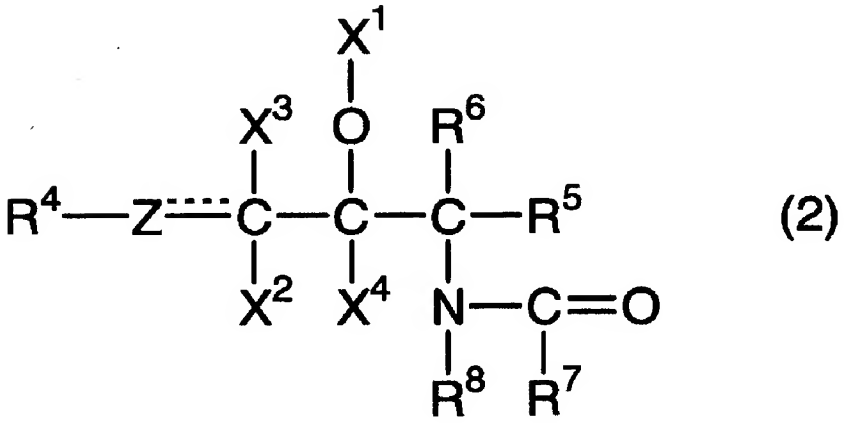
[Chemical formula 2]



(1)

[wherein, R^1 represents a linear or branched C_{1-12} hydrocarbon group which may be substituted with hydroxy and/or alkoxy group(s), R^2 represents a linear or branched divalent C_{1-5} hydrocarbon group, and R^3 represents a linear or branched divalent C_{1-22} hydrocarbon group],

[Chemical formula 3]

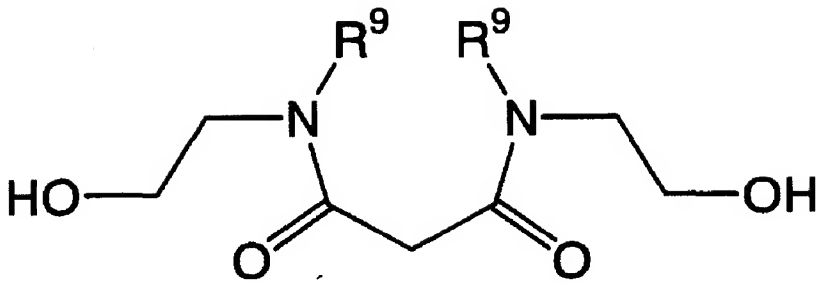


(2)

[wherein, R^4 represents a linear, branched or cyclic, saturated or unsaturated C_{4-30} hydrocarbon group which may be substituted with hydroxy, oxo or amino group(s), Z

represents a methylene group, a methine group or an oxygen atom, a broken line represents the presence or absence of a π bond, X^1 represents a hydrogen atom, acetyl group or glyceryl group, or, together with the adjacent oxygen atom, forms an oxo group, X^2, X^3 and X^4 each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z represents a methine group, one of X^2 and X^3 represents a hydrogen atom and the other does not exist, and when $-O-X^1$ represents an oxo group, X^1 does not exist), R^5 and R^6 each independently represents a hydrogen atom, a hydroxy group, a hydroxymethyl group or an acetoxymethyl group, R^7 represents a linear, branched or cyclic, saturated C_{5-35} hydrocarbon group which may be substituted with hydroxy or amino group(s), or the saturated C_{5-35} hydrocarbon group in which a linear, branched or cyclic, saturated or unsaturated C_{8-22} fatty acid which may be substituted with a hydroxy group is ester-bonded at the ω-position of the hydrocarbon group, and R^8 represents a hydrogen atom or a linear or branched, saturated or unsaturated hydrocarbon group which may have substituent(s) selected from a hydroxy group, hydroxyalkoxy groups, alkoxy groups and an acetoxy group and has 1 to 8 carbon atoms in total],

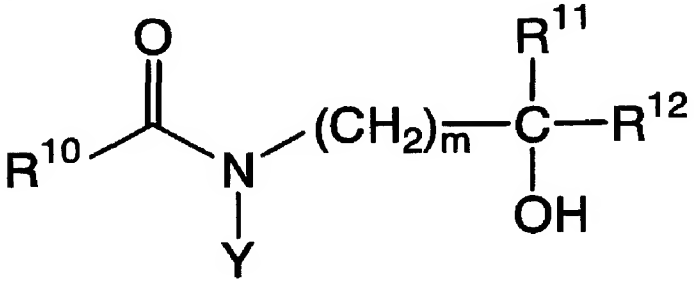
[Chemical formula 4]



(3)

[wherein, R^9 represents a C_{10-18} alkyl group which may be substituted with hydroxy group(s)], and

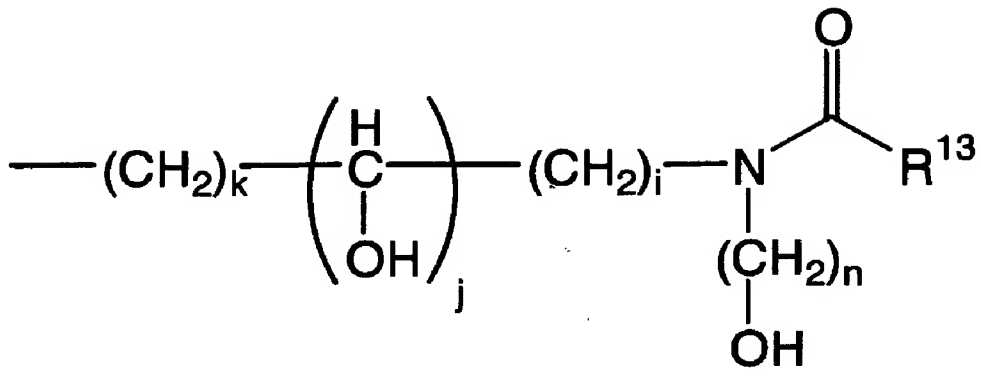
[Chemical formula 5]



(4)

[wherein, R^{10} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s), or a 2-dodecen-1-yl succinic acid residue, m stands for an integer from 1 to 3, R^{11} and R^{12} each represents a hydrogen atom or a C_{1-4} alkyl or hydroxyalkyl group, Y represents a linear or branched, saturated or unsaturated C_{10-32} alkyl group which may be substituted with hydroxy group(s), or a substituent represented by the following formula:

[Chemical formula 6]



(in which, k, i and n each stands for an integer from 1 to 3, j stands for 0 or 1, and R^{13} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s))].

[Claim 3]

The hair cosmetic composition of Claim 1 or 2, wherein the acidic neutralized salt of the tertiary amine type compound as Component (B) is a salt of an acid selected from acidic amino acids, organic acids and inorganic acids.

[Claim 4]

The hair cosmetic composition of Claim 1 or 2, wherein the acidic neutralized salt of the tertiary amine type compound as Component (B) is a salt of an α-hydroxycarboxylic acid.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Belongs]

The present invention relates to hair cosmetic compositions capable of protecting hair from physical or chemical stimulation to prevent split ends or broken hair, capable of imparting hair with a pleasant touch such as moist feeling, smoothness, and suppleness which healthy hair inherently possesses, and excellent in storage stability.

[0002]

[Prior Art]

Since hair is daily exposed to physical stimulation by daily hair care routines such as heat drying with a hair dryer and brushing, and chemical stimulation by shampooing, permanent waving, dyeing and bleaching, it is in a damaged state with a partial loss of components or structure. A change in hair quality due to ageing accelerates this damage and also causes the loss of suppleness which healthy hair inherently possesses.

[0003]

It is a common practice to protect or repair hair in a damaged state by making up for the lost components or structure or analogue thereof. Interaction (affinity) between a protecting base and hair is considered to be important for developing a protecting or restoring function, and thus a method of using a sphingolipid or protein derivative as a protecting base has been used widely as a

useful technique. For example, proposed is a cationic dispersing agent for hair care or hair protection containing a ceramide or glycoceramide and a specific quaternary ammonium compound (refer to Patent Document 1). The agent however cannot contain a sufficient amount of a protecting base such as a ceramide or glycoceramide because it has a high melting point and is liable to crystallize. Moreover, this protecting base, though added in a slight amount, does not readily penetrate into hair. The conventional hair cosmetic composition is therefore accompanied by the problem that the protecting base incorporated therein cannot fully function, because it cannot be fed to hair in an adequate amount.

[0004]

In addition, it is difficult to incorporate the above-described protecting base stably in the hair cosmetic composition because it has a high melting point. There is also a problem that the protecting base is liable to cause separation, gelation or crystallization with the passage of time.

[0005]

[Patent Document 1]

Japanese Patent Laid-Open No. Hei 6-502660

[0006]

[Problems that the Invention is to Solve]

An object of the present invention is to provide a hair cosmetic composition which has benefits including ability to allow a protecting base incorporated therein to penetrate into hair sufficiently, has excellent effects of preventing or repairing hair damage, and has excellent storage stability.

[0007]

[Means for Solving the Problems]

The present inventors have found that, by incorporating an acidic neutralized salt of a specific tertiary amine type compound in an amphipathic amide lipid serving as a protecting base and acidifying the system, the amphipathic amide lipid can readily penetrate into hair and the hair is protected from physical or chemical stimulation, whereby split ends or broken hair is prevented; hair is significantly imparted with a pleasant touch such as natural smoothness, moist feeling and suppleness which healthy hair inherently possesses; and the storage stability of the composition is greatly improved.

[0008]

In the present invention, there is thus provided a hair cosmetic composition comprising the following components (A) and (B):

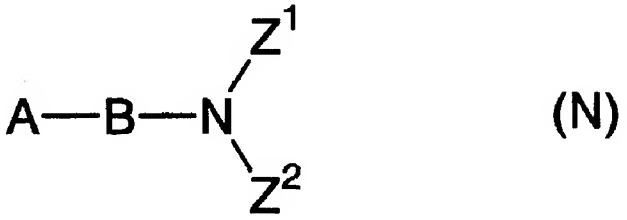
(A) an amphipathic amide lipid,

(B) a tertiary amine type compound represented by the

following formula (N):

[0009]

[Chemical formula 7]



(N)

[0010]

[wherein, A represents a hydrogen atom or a linear or branched, saturated or unsaturated amide, (N-hydrocarbon)carbamoyl, acyloxy or hydrocarbonoxy group each having 12 to 24 carbon atoms in total, B represents a linear or branched, saturated or unsaturated divalent C_{1-22} hydrocarbon group, and Z^1 and Z^2 each independently represents a C_{1-4} alkyl group] or a salt of the compound; and having a pH of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[0011]

[Mode for Carrying out the Invention]

The amphipathic amide lipid as Component (A) has 1 or 2 amide groups; has, as a carbon chain bonded to the carbonyl group of the amide group, a C_{5-60} alkyl or alkylene group which may be substituted with a hydroxy group and may contain an ester bond in its main chain; and contains 1 to

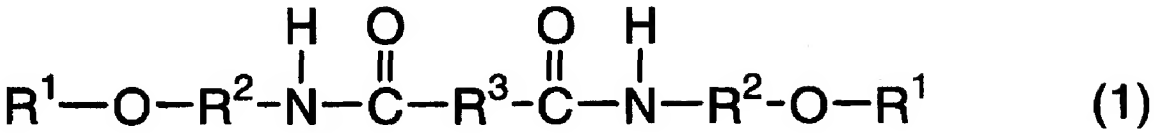
5 hydroxy or C_{1-30} alkoxy groups in total. The following compounds (1) to (4) are specific examples of the amphipathic amide lipid.

[0012]

(1) Diamide compounds represented by formula (1):

[0013]

[Chemical formula 8]



(1)

[0014]

[wherein, R^1 represents a linear or branched C_{1-12} hydrocarbon group which may be substituted with hydroxy group(s) and/or alkoxy group(s), R^2 represents a linear or branched divalent C_{1-5} hydrocarbon group and R^3 represents a linear or branched divalent C_{1-22} hydrocarbon group].

[0015]

As R^1 in the formula (1), linear or branched C_{1-12} alkyl groups which may be substituted with 1 to 3 groups selected from the class consisting of a hydroxy group and C_{1-6} alkoxy groups are preferred. Of these, unsubstituted C_{1-12} alkyl groups and C_{2-12} alkyl groups substituted with 1 to 2 hydroxy groups and one C_{1-6} alkoxy group or with one hydroxy group and one C_{1-6} alkoxy group are more preferred. Specific examples include methyl, ethyl, propyl, butyl,

hexyl, dodecyl, 2-methylpropyl, 2-ethylhexyl, 2-hydroxyethyl, 9-hydroxynonyl, 2,3-dihydroxypropyl, 2-methoxyethyl, 2-hydroxy-3-methoxypropyl and 9-methoxynonyl groups, of which 2-hydroxyethyl, methyl, dodecyl and 2-methoxyethyl groups are preferred.

[0016]

As R^2 in the formula (1), linear or branched C_{2-5} alkylene groups, especially linear or branched C_{2-3} alkylene groups are preferred. Specific examples include ethylene, trimethylene, tetramethylene, pentamethylene, 1-methylethylene, 2-methylethylene, 1-methyltrimethylene, 2-methyltrimethylene, 1,1-dimethylethylene and 2-ethyltrimethylene groups. Of these, ethylene and trimethylene groups are preferred.

[0017]

As R^3 in the formula (1), linear or branched divalent C_{2-22} hydrocarbon groups are preferred, and linear or branched C_{11-22} alkylene groups and alkenylene groups having 1 to 4 double bonds are especially preferred. Specific examples include ethylene, trimethylene, tetramethylene, hexamethylene, heptamethylene, octamethylene, decamethylene, undecamethylene, dodecamethylene, tridecamethylene, tetradecamethylene, hexadecamethylene, octadecamethylene, 1-methylethylene, 2-ethyltrimethylene, 1-methylheptamethylene, 2-methylheptamethylene, 1-

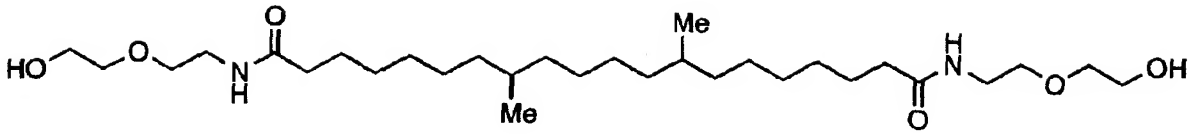
butylhexamethylene, 2-methyl-5-ethylheptamethylene, 2,3,6-trimethylheptamethylene, 6-ethyldecamethylene, 7-methyltetradecamethylene, 7-ethylhexadecamethylene, 7,12-dimethyloctadecamethylene, 8,11-dimethyloctadecamethylene, 7,10-dimethyl-7-ethylhexadecamethylene, 1-octadecylethylene, ethenylene, 1-octadecenylethylene, 7,11-octadecadienylene, 7-ethenyl-9-hexadecamethylene, 7,12-dimethyl-7,11-octadecadienylene and 8,11-dimethyl-7,11-octadecadienylene groups. Of these, 7,12-dimethyloctadecamethylene, 7,12-dimethyl-7,11-octadecadienylene, octadecamethylene, undecamethylene and tridecamethylene groups are especially preferred.

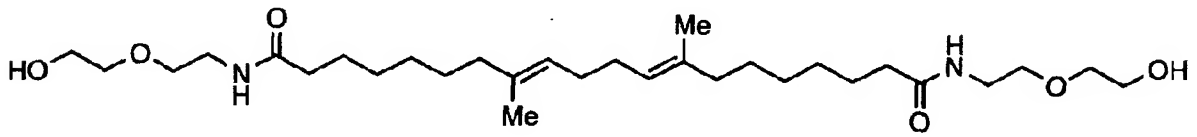
[0018]

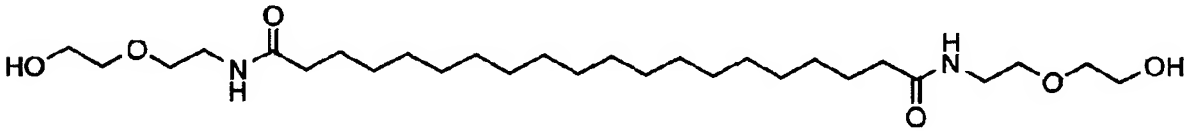
Especially preferred diamide compounds (1) are compounds having the above-described preferred groups as R^1, R^2 and R^3, respectively, in combination. Specific examples are the following compounds:

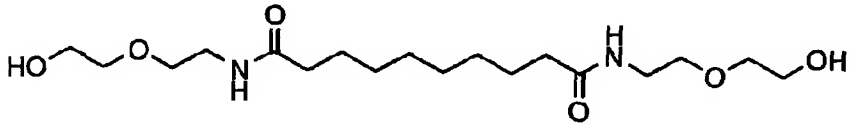
[0019]

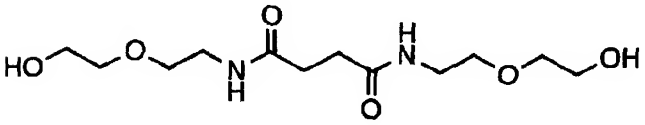
[Chemical formula 9]

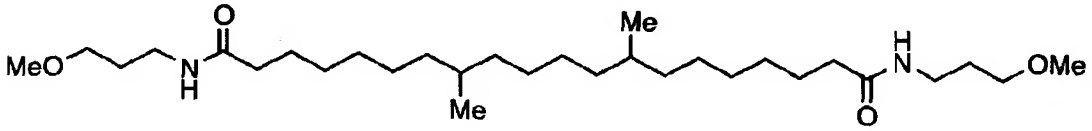


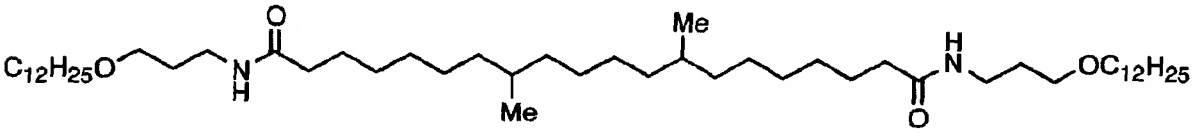


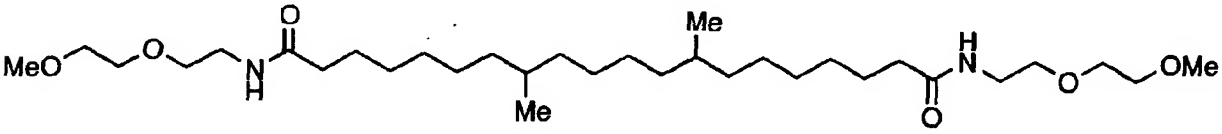


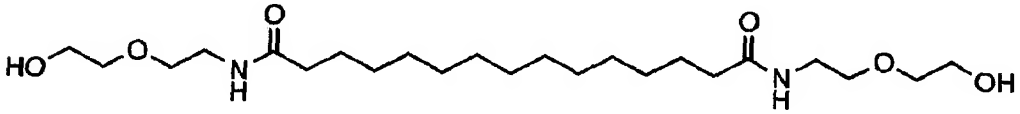


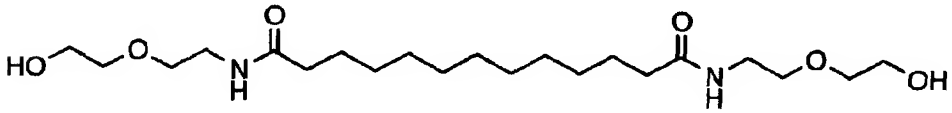


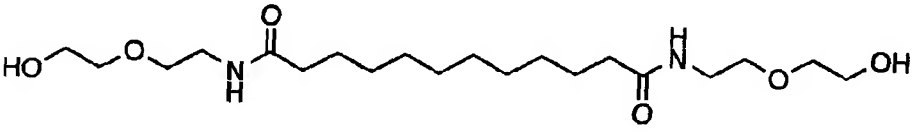






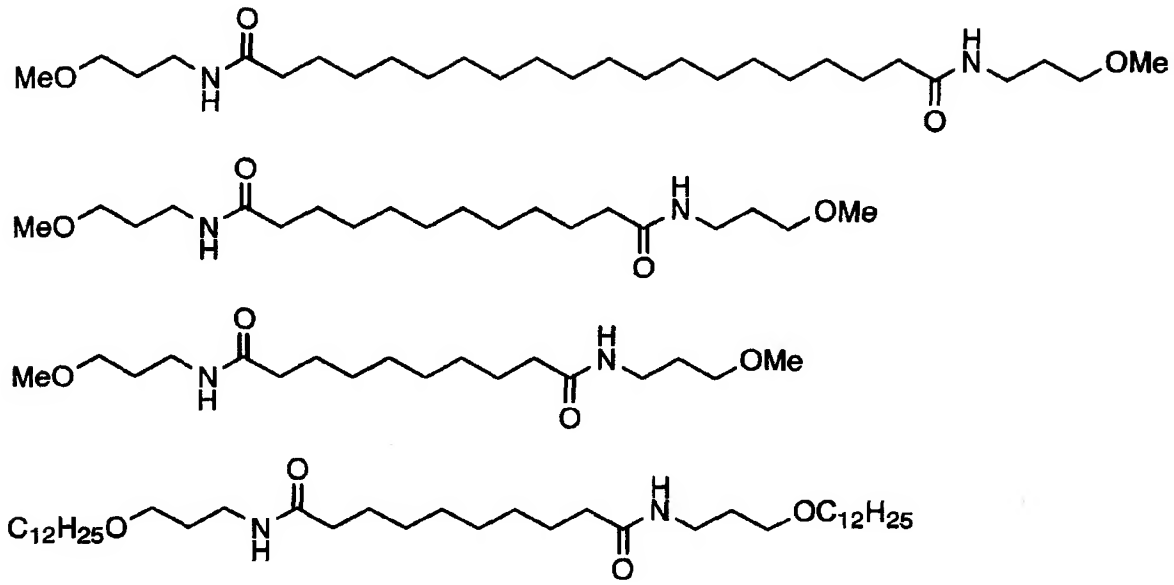






[0020]

[Chemical formula 10]

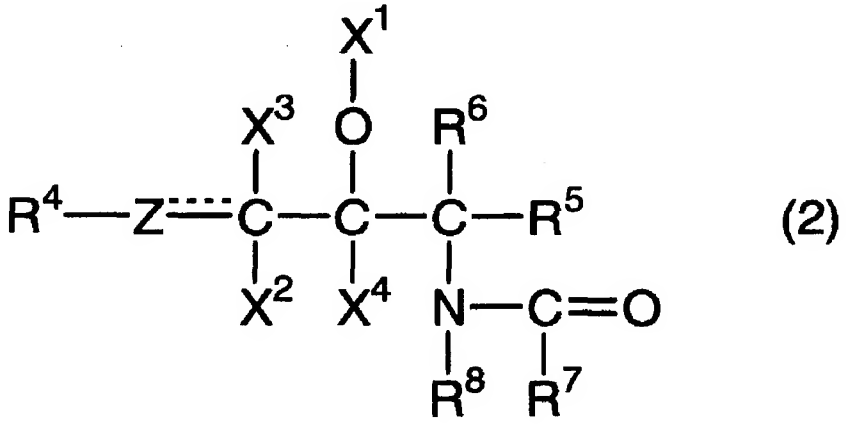


[0021]

(2) Ceramides represented by the following formula (2):

[0022]

[Chemical formula 11]



(2)

[0023]

[wherein, R^4 represents a linear, branched or cyclic, saturated or unsaturated C_{4-30} hydrocarbon group which may be substituted with hydroxy, oxo or amino group(s), Z represents a methylene group, a methine group or an oxygen atom, a broken line represents the presence or absence of a π bond, X^1 represents a hydrogen atom, an acetyl group or a glyceryl group, or, together with the adjacent oxygen atom, forms an oxo group, X^2, X^3 and X^4 each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z represents a methine group, one of X^2 and X^3 represents a hydrogen atom and the other does not exist, and when $-O-X^1$ represents an oxo group, X^1 does not exist), R^5 and R^6 each independently represents a hydrogen atom, a hydroxy group, a hydroxymethyl group or an acetoxymethyl group, R^7 represents a linear, branched or cyclic, saturated C_{5-35} hydrocarbon group which may be substituted with a hydroxy or amino group, or the saturated C_{5-35} hydrocarbon group in which a linear, branched or cyclic, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-position of the hydrocarbon group, and R^8 represents a hydrogen atom or a linear or branched, saturated or unsaturated hydrocarbon group which may have substituent(s) selected from a hydroxy group, hydroxyalkoxy groups, alkoxy groups and an acetoxy

group, and has 1 to 8 carbon atoms in total].

[0024]

As R^4 in the formula (2), linear, branched or cyclic, saturated or unsaturated C_{7-22} hydrocarbon groups which may be substituted with hydroxy group(s) are preferred. As X^1, a hydrogen atom and a glyceryl group are preferred. It is preferred that none or one of X^2, X^3, and X^4 represents a hydroxy group and the others represent a hydrogen atom. It is preferred that one of R^5 and R^6 represents a hydrogen atom or a hydroxymethyl group and the other represents a hydrogen atom. In R^7, preferred examples of the fatty acid which may be ester-bonded or amide-bonded to the saturated hydrocarbon group at the ω-position thereof include isostearic acid, 12-hydroxystearic acid and linoleic acid. As R^8, a hydrogen atom and hydrocarbon groups which may be substituted with 1 to 3 substituents selected from the class consisting of a hydroxy group, hydroxyalkoxy groups and alkoxy groups and have 1 to 8 carbon atoms in total are preferred.

[0025]

As the ceramide (2), preferred are the following compounds (2a) and (2b).

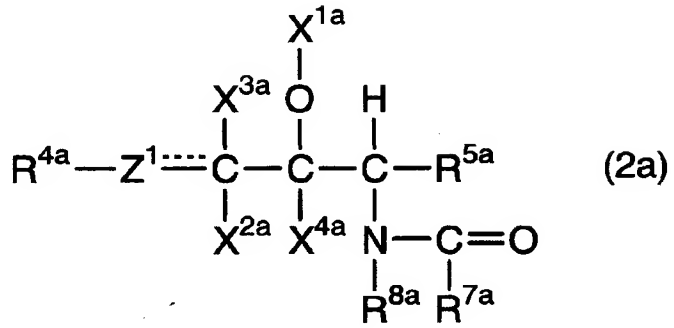
[0026]

(2a) Natural ceramides or natural type ceramides represented by the following formula (2a), and derivatives

thereof (which will hereinafter be called "natural type ceramides")

[0027]

[Chemical formula 12]



(2a)

[0028]

[wherein, R^{4a} represents a linear, branched or cyclic, saturated or unsaturated C_{7-19} hydrocarbon group which may be substituted with a hydroxy group, Z^1 represents a methylene or methine group, a broken line represents the presence or absence of a π bond, X^{1a} represents a hydrogen atom or, together with the adjacent oxygen atom, forms an oxo group, X^{2a}, X^{3a} and X^{4a} each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z^1 represents a methine group, one of X^{2a} and X^{3a} represents a hydrogen atom and the other does not exist, and when $-O-X^{1a}$ represents an oxo group, X^{4a} does not exist), R^{5a} represents a hydroxymethyl group or an acetoxymethyl group, R^{7a} represents a linear, branched or cyclic, saturated C_{5-30} hydrocarbon group which may be

substituted with hydroxy group(s), or the saturated C_{5-30} hydrocarbon group in which a linear or branched, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-end of the alkyl group, and R^{8a} represents a hydrogen atom or a C_{1-4} alkyl group].

[0029]

Preferred are compounds in which R^{4a} is a linear C_{7-19}, more preferably C_{13-15} alkyl group, Z^1 is a methine group, one of X^{2a} and X^{3a} is a hydrogen atom, and R^{7a} is a linear C_{9-27} alkyl group which may be substituted with hydroxy group(s). In addition, X^{1a} preferably represents a hydrogen atom or, together with an oxygen atom, forms an oxo group. More preferred examples of R^{7a} include a tricosyl group, a 1-hydroxypentadecyl group, a 1-hydroxytricosyl group, a heptadecyl group, a 1-hydroxyundecyl group and a nonacosyl group having a linoleic acid ester-bonded at the ω-position of the group.

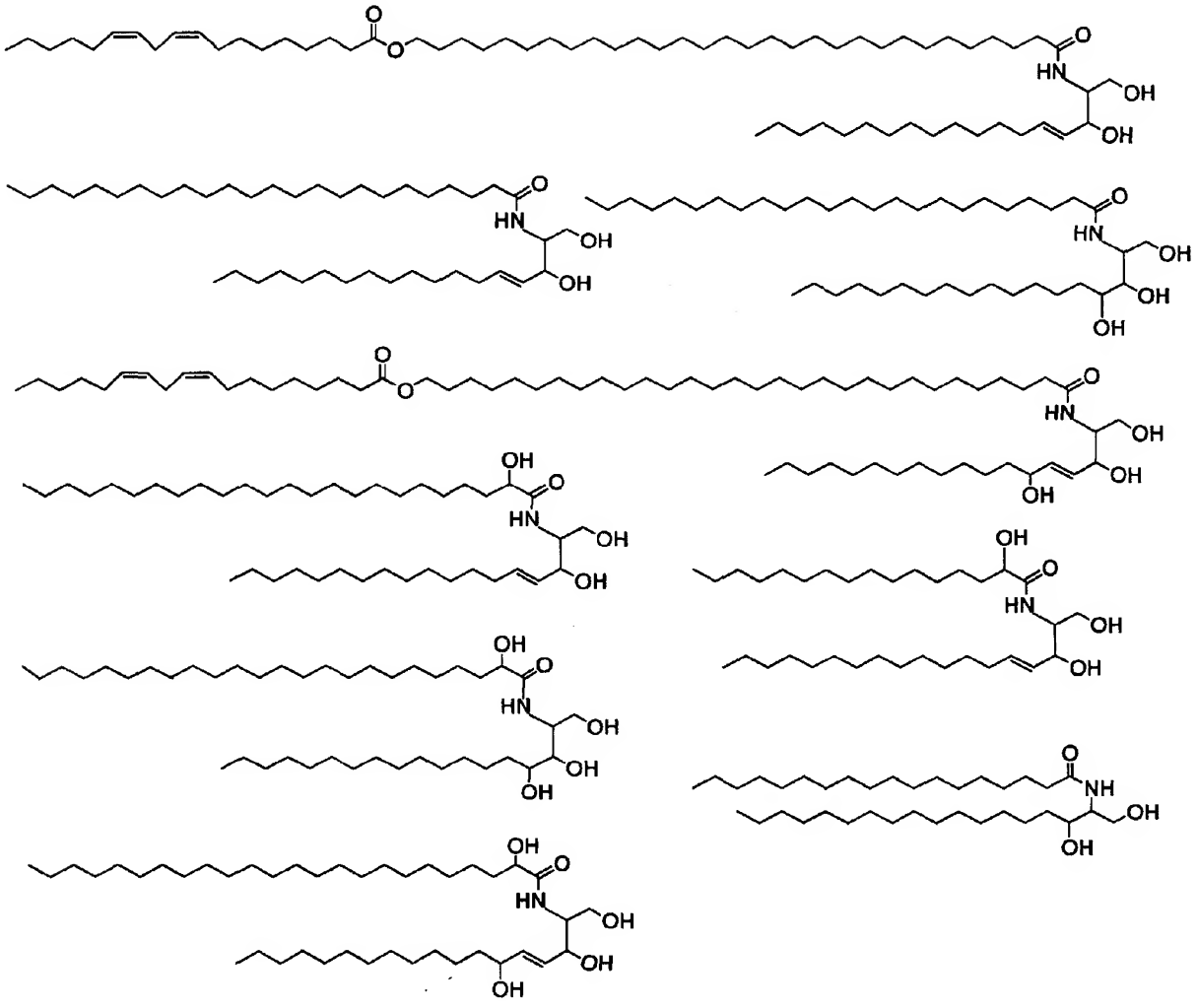
[0030]

Specific examples of the natural type ceramides include Ceramide Types 1 to 7 having the below-described structures and obtained by amidation of sphingosine, dihydrosphingosine, phytosphingosine or sphingadienine (for example, FIG. 2 of *J. Lipid Res.*, 24, 759(1983), and pig and human ceramides as described in FIG. 4 of *J. Lipid Res.*,

35, 2069(1994)).

[0031]

[Chemical formula 13]



[0032]

Examples also include N-alkyl derivatives (for example, N-methyl derivatives) of the above-described ceramides. They may be either a natural extract or synthesized product. Commercially available ones are also

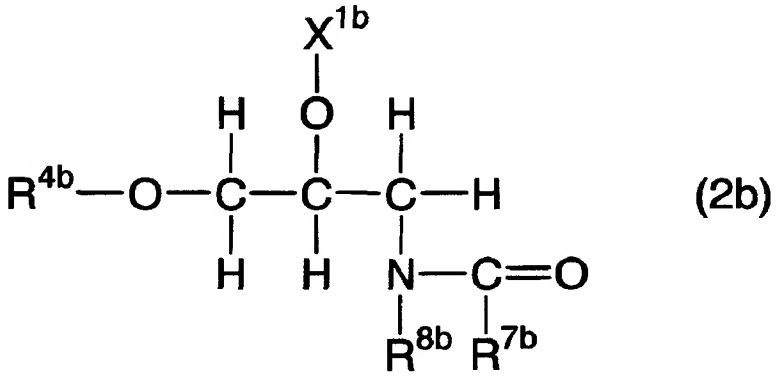
usable.

[0033]

(2b) Pseudo type ceramides represented by the following formula (2b):

[0034]

[Chemical formula 14]



(2b)

[0035]

[wherein, R^{4b} represents a linear, branched or cyclic, saturated or unsaturated C_{10-22} hydrocarbon group which may be substituted with hydroxy group(s), X^{1b} represents a hydrogen atom, an acetyl group or a glyceryl group, R^{7b} represents a linear, branched or cyclic, saturated or unsaturated C_{5-22} hydrocarbon group which may be substituted with hydroxy or amino group(s), or the saturated or unsaturated C_{5-22} hydrocarbon group in which a linear or branched, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-end of the hydrocarbon group, and R^{8b} represents a

hydrogen atom or an alkyl group which may be substituted with hydroxy group(s), hydroxyalkoxy group(s), alkoxy group(s) or acetoxy group(s) and has 1 to 8 carbon atoms in total].

[0036]

Preferred as R^{7b} are a nonyl group, a tridecyl group, a pentadecyl group, an undecyl group having linoleic acid ester-bonded at the ω-position of the group, a pentadecyl group having linoleic acid ester-bonded at the ω-position of the group, a pentadecyl group having 12-hydroxystearic acid ester-bonded at the ω-position of the group, and an undecyl group having methyl-branched isostearic acid amide-bonded at the ω-position of the group. As the hydroxyalkoxy or alkoxy groups for R^{8b}, preferred are those having 1 to 8 carbon atoms.

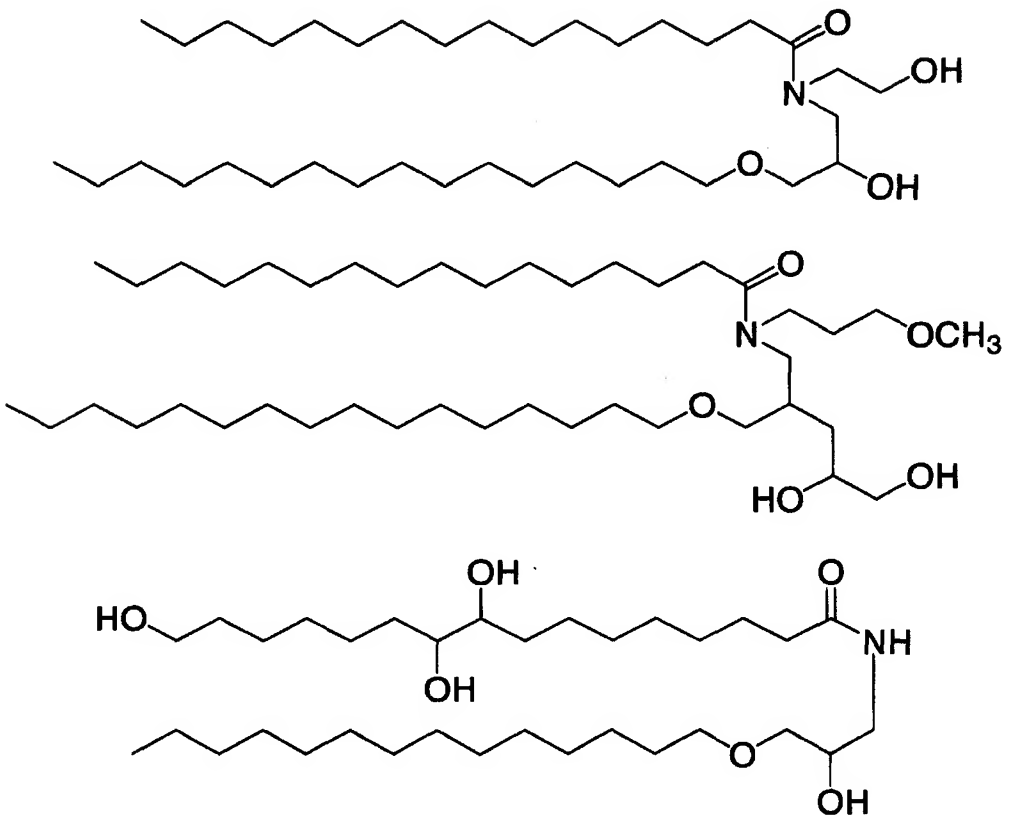
[0037]

As the pseudo type ceramides (2b), those having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a pentadecyl group, and as R^{8b} a hydroxyethyl group; those having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a nonyl group, and as R^{8b} a hydroxyethyl group; or those having as R^{4b} a hexadecyl group, as X^{1b} a glyceryl group, as R^{7b} a tridecyl group, and as R^{8b} a 3-methoxypropyl group are preferred, with those (2b) having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a pentadecyl group, and as R^{8b}

a hydroxyethyl group being especially preferred. Specific preferred examples include those represented by the following formulas:

[0038]

[Chemical formula 15]

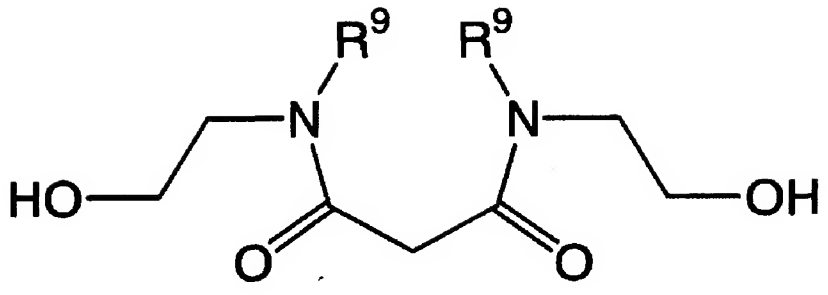


[0039]

(3) Diamide compounds represented by the following formula (3):

[0040]

[Chemical formula 16]



(3)

[0041]

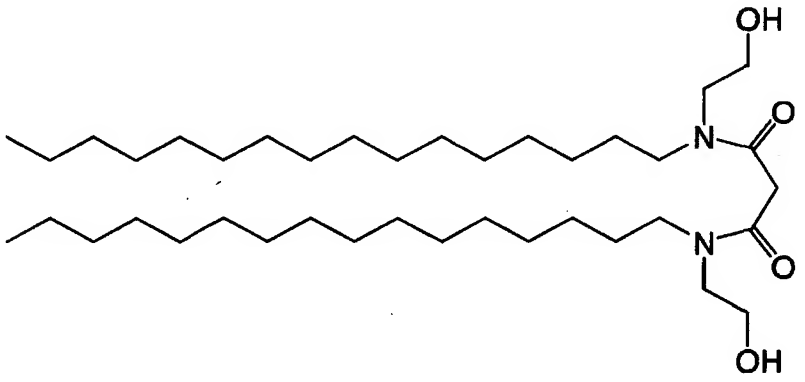
[wherein, R^9 represents a C_{10-18} alkyl group which may be substituted with hydroxy group(s)].

[0042]

Specific examples of compound (3) include the compound represented by the following formula:

[0043]

[Chemical formula 17]

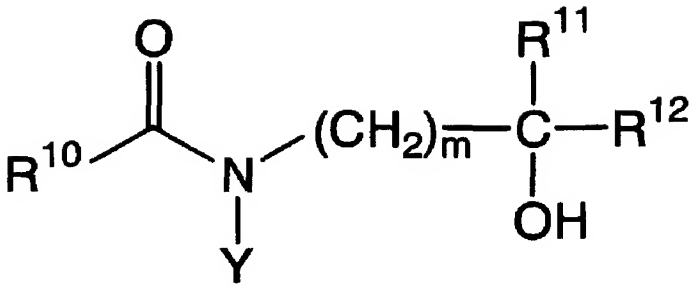


[0044]

(4) Amide compounds represented by the following formula (4):

[0045]

[Chemical formula 18]



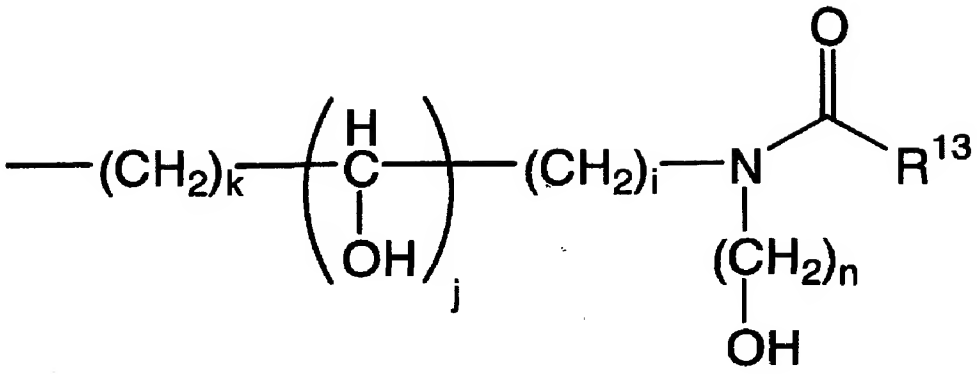
(4)

[0046]

[wherein, R^{10} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s), or a 2-dodecen-1-yl succinic acid residue, m stands for an integer from 1 to 3, R^{11} and R^{12} each represents a hydrogen atom or a C_{1-4} alkyl or hydroxyalkyl group, Y represents a linear or branched, saturated or unsaturated C_{10-32} alkyl group which may be substituted with hydroxy group(s), or a substituent represented by the following formula:

[0047]

[Chemical formula 19]



[0048]

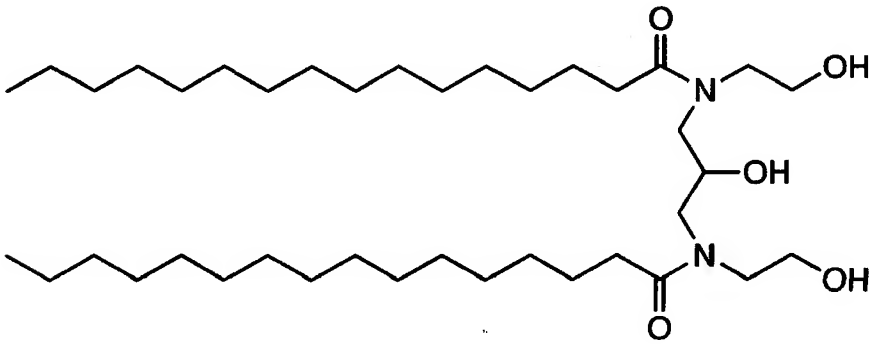
(in which, k, i and n each stands for an integer of from 1 to 3, j stands for 0 or 1, and R^{13} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s))].

[0049]

Specific examples of Compound (4) include a compound represented by the following formula:

[0050]

[Chemical formula 20]



[0051]

As Component (A), two or more of these amphipathic

amide lipids may be used in combination. Its (their) content in the hair cosmetic composition of the present invention is preferably from 0.001 to 20 wt.%, more preferably from 0.15 to 5 wt.%, especially preferably from 0.2 to 3 wt.% in view of imparting suppleness to hair and preventing split ends or breakage of hair.

[0052]

In the formula (N) representing the tertiary amine type compound as Component (B), when A represents a group other than a hydrogen atom, A is preferably a group having 14 to 22, especially preferably 18 to 22 carbon atoms in total. Moreover, the hydrocarbon moiety of the compound is preferably saturated, especially preferably linear. In this case, a trimethylene group is especially preferred as B. When A is a hydrogen atom, on the other hand, B preferably represents a C_{18-22} group, of which saturated groups are preferred, and saturated and linear groups are especially preferred. Examples of Z^1 and Z^2 include methyl, ethyl, propyl, isopropyl, butyl and tert-butyl groups, with methyl and ethyl groups being preferred and methyl group being especially preferred.

[0053]

The salt of the tertiary amine type compound as Component (B) is formed by neutralizing reaction between the tertiary amine type compound and an acidic amino acid,

organic acid or inorganic acid. Acidic amino acids include glutamic acid and aspartic acid. Organic acids include carboxylic acids such as monocarboxylic acids, dicarboxylic acids, hydroxycarboxylic acids and polycarboxylic acids, alkylsulfuric acids and alkylphosphoric acids. Of these, carboxylic acids are preferred and dicarboxylic acids and hydroxycarboxylic acids are especially preferred. Dicarboxylic acids include malonic acid, succinic acid, glutaric acid, adipic acid, maleic acid, fumaric acid and phthalic acid, while hydroxycarboxylic acids include glycolic acid, lactic acid, hydroxyacrylic acid, oxybutyric acid, glyceric acid, malic acid, tartaric acid and citric acid. Organic acids include phosphoric acid, sulfuric acid, nitric acid and hydrochloric acid. Of these, organic acids are preferred, with α-hydroxycarboxylic acids, especially lactic acid and malic acid are preferred.

[0054]

As Component (B), two or more of the above-described tertiary amine type compounds or salts thereof may be used in combination. Its (their) content in the hair cosmetic composition of the present invention is preferably from 0.1 to 10 wt.%, more preferably from 0.5 to 5 wt.%, especially preferably from 1 to 4 wt.%, each in terms of amine, in view of smooth touch during from application to rinsing and after drying, and stability of the system.

[0055]

For the purpose of stabilization of the hair cosmetic composition, improvement in the feeling upon use, viscosity regulation, and solubilization and dispersion-emulsification of various bases, a surfactant, preferably an amphoteric or nonionic surfactant may be incorporated in the hair cosmetic composition of the present invention.

[0056]

As the amphoteric surfactant, carbobetaines having a C_{8-24} alkyl, alkenyl or acyl group, amidobetaines, sulfobetaines, hydroxysulfobetaines, amidosulfobetaines, phosphobetaines and imidazolinium are usable. Counterions of the anionic group of these amphoteric surfactants include hydrogen ions, alkali metal ions, alkaline earth metal ions, ammonium ions and alkanolamine ions, while counterions of the cationic group include halide ions, methosulfate ions, and saccharinate ions.

[0057]

Preferred amphoteric surfactants include laurylamidopropyl betaine ("AMPHITOL 20AB"; product of Kao Corp.), cocoylamidopropyl betaine ("AMPHITOL 55AB"; product of Kao Corp.), lauryldimethylaminoacetic acid betaine ("AMPHITOL 20BS"; product of Kao Corp.), laurylhydroxysulfobetaine ("AMPHITOL 20H"; product of Kao Corp.), and 2-alkyl-N-carboxymethyl-N-

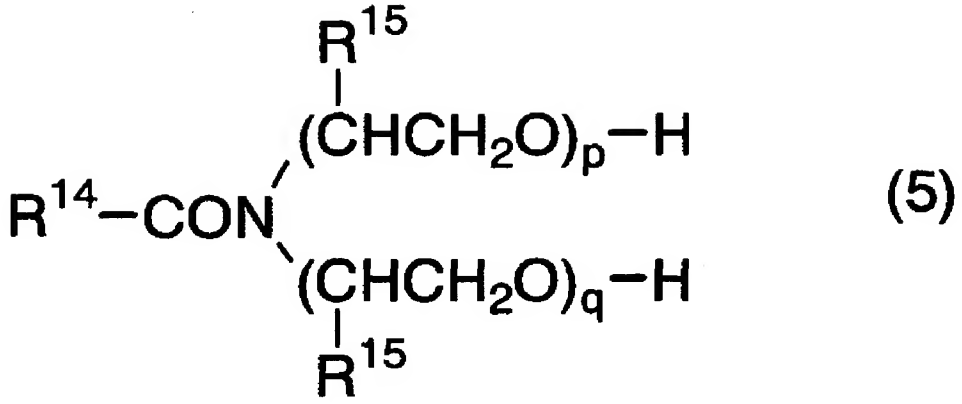
hydroxyethylimidazolinium betaines such as sodium cocoamphoacetate ("AMPHITOL 20YN"; product of Kao Corp.), sodium cocoamphopropionate ("AMPHITOL 20X, Y-B"; product of Kao Corp.) and sodium N-cocoyl acyl-N-carboxyethyl-N-hydroxyethyl ethylenediamine ("Softazoline NS"; product of Kao Corp)

[0058]

Examples of the nonionic surfactant include polyoxyalkylene alkyl (or alkenyl) ethers added with 1 to 20 moles of EO, PO or butylene oxides (which will hereinafter be abbreviated as "BO") and having an alkyl or alkenyl group with 10 to 20 carbon atoms on average, polyoxyalkylene alkyl phenyl ethers added with 1 to 20 moles of EO or PO and having an alkyl group with 6 to 12 carbon atoms on average, polyoxyalkylene alkyl (or alkenyl) ethers added with 1 to 30 moles, in total, of EO and PO or EO and BO (an EO/PO or EO/BO ratio is in the range of from 0.1/9.9 to 9.9/0.1) and having an alkyl or alkenyl group with 10 to 20 carbon atoms on average, higher fatty acid alkanolamides represented by the following formula (5):

[0059]

[Chemical formula 21]



(5)

[0060]

[wherein, R^{14} represents a C_{7-21} alkyl or alkenyl group, R^{15} represents a hydrogen atom or a methyl group, p stands for an integer of from 1 to 3 and q stands for an integer of from 0 to 3],

[0061]

or alkylene oxide adducts thereof, sucrose fatty acid esters composed of a fatty acid having 10 to 20 carbon atoms on average and sucrose, and glycerin fatty acid monoesters composed of a fatty acid having 10 to 20 carbon atoms on average and glycerin.

[0062]

Two or more of these surfactants may be used in combination. Its (or their) content in the whole composition is preferably from 0.1 to 20 wt.%. For obtaining a greater effect, 0.5 to 15 wt.% is more preferred, with 1 to 10 wt.% being especially preferred.

[0063]

To the hair cosmetic composition of the present invention, proteins ordinarily employed as a hair protecting component can be added in order to further enhance effects of preventing split ends and broken hair.

[0064]

The term "proteins" embraces proteins, protein hydrolysates and derivatives thereof and they can be extracted or derived from animals or plants. Proteins derived from animals include keratin, elastin, collagen, lactoferrin, casein, α(β)-lactalbumin, globulins, egg albumin and hydrolysates thereof. Of these, keratin, elastin, collagen and casein, and hydrolysates thereof are preferred. Examples of the protein derived from plants include extracts from wheat, malt, oat, barley, corn, rice, soybean, broad bean, silk, seeds of lupine, potatoes, and apricot kernel, and hydrolysates thereof. Of these, proteins from wheat, soybean and silk, and hydrolysates thereof are preferred. As the protein, two or more of the above-described ones may be used in combination, and its (or their) content in the whole composition is preferably from 0.01 to 5 wt.%, more preferably from 0.05 to 4 wt.%, especially preferably from 0.1 to 3 wt.%.

[0065]

To the hair cosmetic composition of the present

invention, a silicone derivative or cationic polymer conventionally employed as a component for improving the feeling to the touch may be added in order to further improve the feeling upon use.

[0066]

Examples of the silicone derivative include dimethylpolysiloxane, methylphenylpolysiloxane, amino-modified silicones, polyether-modified silicones, epoxy-modified silicones, fluorine-modified silicones, cyclic silicones, alkyl-modified silicones, and oxazoline-modified silicones. Of these, dimethylpolysiloxane, methylphenylpolysiloxane, amino-modified silicones, polyether-modified silicones, oxazoline-modified silicones and cyclic silicones are preferred. Two or more of these silicone derivatives may be used in combination and its (or their) content in the whole composition is preferably from 0.01 to 20 wt.%, more preferably from 0.05 to 10 wt.%, especially preferably from 0.1 to 5 wt.%.

[0067]

Examples of the cationic polymer include polydimethyldiallylammonium chlorides, acrylamidopropyltrimethylammonium chloride/acrylate copolymers, acrylamide/dimethyldiallylammonium chloride copolymers, methylvinylimidazolinium chloride/vinylpyrrolidone copolymers, hydroxyethyl

cellulose/diallyldimethylammonium chloride copolymers, diethylsulfates of vinylpyrrolidone/dimethylaminoethyl methacrylate copolymers, vinylpyrrolidone/dimethylaminoethylmethyl methacrylate copolymers, vinylpyrrolidone/alkylaminoacrylate/vinylcaprolactam copolymers, vinylpyrrolidone/dimethylaminopropylmethacrylamide copolymers, chlorinated O-[2-hydroxy-3-(trimethylammonio)propyl]hydroxy cellulose, and guar hydroxypropyltrimonium chloride. Two or more of these cationic polymers may be used in combination. Its (or their) content in the whole composition is, as a solid content, preferably from 0.01 to 20 wt.%, more preferably from 0.05 to 10 wt.%, especially preferably from 0.1 to 5 wt.%.

[0068]

The hair cosmetic composition of the present invention can contain, in addition to the above-described components, oil components such as cholesterol and derivatives thereof, petrolatum, lanolin derivatives, and fatty acid esters of polyethylene glycol; high molecular emulsifiers such as polycarboxylic acids, crosslinked carboxylic acid/carboxylate copolymers, crosslinked acrylic acid/acrylate copolymers and acrylamide/butanesulfonic

acrylamide copolymers; polyhydric alcohols such as glycerin and sorbitol; humectants; chelating agents such as ethylenediaminetetraacetic acid (EDTA); drugs such as vitamin preparations; amino acids and derivatives thereof; fine particles of a polymer such as polyethylene, polystyrene, poly(methyl methacrylate), nylon or silicone, and hydrophobic products thereof; extracts from animals or plants; ultraviolet absorbers; pearling agents; antiseptics; bactericides; anti-inflammatory agents; anti-dandruffs; pH regulators; colorants; and fragrances, according to the intended use.

[0069]

The hair cosmetic composition of the present invention can be classified into those used in bath rooms such as hair conditioners, hair treatments and hair packs, and styling agents used outside bath rooms such as hair milks, hair creams and hair waxes.

[0070]

The hair cosmetic composition of the present invention is adjusted to a pH of from 1 to 4.5 when applied to hair (i.e. when diluted with water to 20 times the weight of the composition) in view of allowing Component (A) (amphipathic amide lipid) to penetrate into hair sufficiently while suppressing stimulation. The pH is more preferably from 2 to 4, with pH from 3 to 4 being

especially preferred.

[0071]

The hair cosmetic composition of the present invention can be provided in any form such as liquid, powder, gel and granule as needed. A liquid composition using water or a lower alcohol as a solvent is preferred, with an aqueous solution being especially preferred.

[0072]

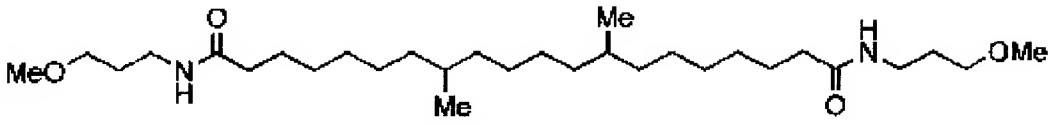
[Examples]

In the below-described Examples and Comparative Examples, the following amphipathic amide lipids were employed.

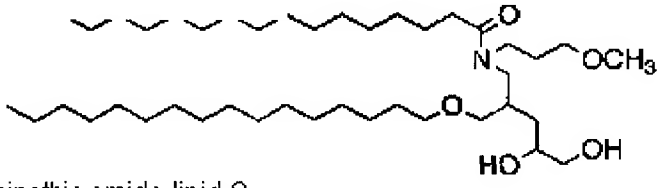
[0073]

[Chemical formula 22]

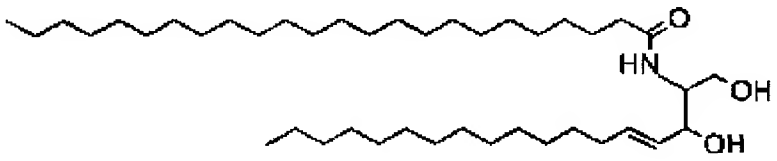
Amphiphathic amide lipid A



Amphipathic amide lipid B

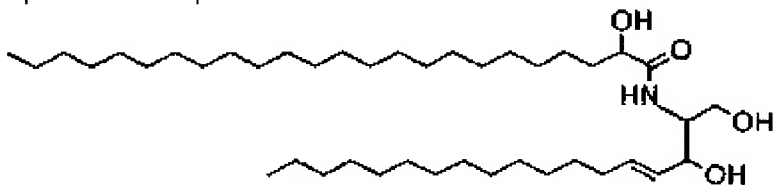


Amphipathic amide lipid C



Ceramide 2

Amphipathic amide lipid D



Ceramide 5

[0074]

Examples 1 to 3, and Comparative Examples 1 to 3

Hair conditioners as shown in Table 1 were prepared in a conventional manner and evaluated.

[0075]

(1) Smoothness and Moist feeling

About 20 g (about 15 cm to 20 cm in length) of the hair of a Japanese female which hair had not yet been subjected to any chemical treatment such as permanent waving or hair dyeing was treated twice with "Lavenus High Bleach" (product of Kao Corp.) at 40°C for 20 minutes (at a

bath ratio of 1:1). After shampooing, 2 g of the hair conditioner shown in Table 1 was uniformly applied to the hair, rinsed with running water for 30 seconds and then dried with a dryer. The "smoothness" and "moist feeling" of the dried hair was organoleptically evaluated in accordance with the following criteria:

[0076]

Smoothness:

A: The hair is imparted with natural and sufficient smoothness.

B: The hair is imparted with smoothness.

C: It is difficult to evaluate whether the hair is imparted with smoothness or not.

D: Friction appears among individual hairs.

[0077]

Moist feeling:

A: The hair becomes very moist to the touch.

B: The hair becomes moist to the touch.

C: It is difficult to evaluate whether the hair becomes moist to the touch or not.

D: The hair does not become moist to the touch.

[0078]

(2) A physical property-recovering ratio of hair

About 20 g (about 15 to 20 cm in length) of the hair of a Japanese female, which had not been subjected to any

chemical treatment such as permanent waving and hair dyeing, was treated 8 times with "LAVENUS High Bleach" (product of Kao Corporation) (bath ratio 1:1) at 40°C for 20 minutes. After each bleaching, the hair was cleansed 90 times with a plain shampoo and a plain rinse, 720 times in total. The plain shampoo and plain rinse have the following compositions.

[0079]

·Plain Shampoo

	(wt.%)
A (25 wt.%) solution of sodium polyoxyethylene (2.5) lauryl ether sulfate	62.00
Lauric acid diethanolamide	2.28
Disodium edetate	0.10
Sodium benzoate	0.50
Oxybenzone	0.03
Phosphoric acid (75 wt.%)	0.10
Dibutylhydroxytoluene	0.01
Sodium chloride	0.80
Red No. 106	0.00012
Fragrance	0.26
Purified water	Balance

[0080]

·Plain Rinse

(wt.%)

Stearyltrimethylammonium chloride (28 wt.%)	2.7
Distearyldimethylammonium chloride	3.6
Cetanol	2.0
Propylene glycol	5.0
Methyl p-hydroxybenzoate	0.1
Deionized water	Balance

[0081]

Dynamic viscoelasticity (storage elastic modulus E': corresponding to the hardness of hair, unit: [Pa]) of each of a hair bundle without treatment (healthy hair), a hair bundle subjected to the above-described bleaching treatment and a hair bundle treated 30 times with the hair conditioner of Table 1 after each bleaching treatment was measured using a viscoelasticity-measuring apparatus "DMTA V" (product of Rheometric Scientific FE).

[0082]

·Measuring conditions

Temperature: 22±1°C, relative humidity: 20±1 %RH, frequency: 10 Hz

·Criteria for evaluation

A physical property-recovering ratio of hair R represented by the equation: R=(E_1'n10 supposing that E_0' represents a storage elastic modulus of the healthy hair, E_1' represents a storage elastic modulus of the bleached hair and E_n' represents a storage elastic modulus of the

hair treated 10 times with each sample after bleaching was calculated as an index of how the physical properties of hair damaged by the bleaching treatment were recovered by the treatment with each sample of Table 1 compared with those of the hair before bleaching (untreated hair):

[0083]

A: from 70 to 100

B: from 50 to 70

C: less than 50

[0084]

(3) Storage stability

In a clear glass bottle, 100 mL of each sample was filled and an accelerated stability test was performed in an incubator (storage temperature of 50°C × 1 month). After completion of the storage term, the bottle was taken out from the incubator and allowed to stand at room temperature for at least 30 minutes. Then, the appearance of the sample was evaluated in accordance with the below-described criteria:

[0085]

A: no change

B: a slight change (for example, creaming or slight discoloration)

C: an apparent change (for example, separation or gelation)

[0086]

[Table 1]

(wt.%)

		Examples			Comparative Examples		
		1	2	3	1	2	3
(A)	Amphipathic amide lipid A	2	2	-	2	2	-
	Amphipathic amide lipid B	-	-	2	-	-	-
(B)	N,N-dimethyloctadecyloxypropylamine	4	-	4	-	4	4
	Stearoamidopropyldimethylamine		4	-	-	-	-
	Lactic acid	2	-	-	2	2	2
	Malic acid	-	2	2	-	-	-
(B')	Stearyltrimethylammonium chloride	-	-	-	5	-	-
Others	Stearyl alcohol	11	11	11	-	11	11
	Behenyl alcohol	-	-	-	8	-	-
	DPG	0.5	0.5	0.5	0.5	0.5	0.5
	Dimethicone	1	1	1	1	1	1
	Benzyloxyethanol	0.3	0.3	0.3	0.3	0.3	0.3
	Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5
	PH regulator (sodium hydroxide, citric acid)	q.s.*	q.s.*	q.s.*	q.s.*	q.s.*	q.s.*
	Purified water	Balance	Balance	Balance	Balance	Balance	Balance
pH		3.2	3	3.5	3.5	7	5.5
Evaluation	Smoothness of hair	A	A	A	C	C	C
	Moist feeling of hair	A	A	A	C	C	C
	Physical property-recovering ratio of hair	A	A	B	C	C	C
	Storage stability	B	B	B	B	D	B

*: An amount to adjust the pH

[0087]

Example 4: Hair Conditioner

(wt.%)

N,N-Dimethyloctadecyloxypropylamine	2.2
Stearyl alcohol	6.0
Dipropylene glycol	5.0
Concentrated glycerin	5.0

Polypropylene glycol	2.5
Amphipathic amide lipid A	0.2
Malic acid (50 wt.%)	1.0
Lactic acid (90 wt.%)	1.7
Sunflower oil	0.5
Benzyloxyethanol	1.0
Dipentaerythritol fatty acid ester	0.1
Phenoxyethanol	0.1
Deionized water	Balance

[0088]

The above-described conditioner (pH 3.1) was excellent in smoothness during rinsing, in smoothness and moist feeling after drying and also in stability.

[0089]

Example 5: Hair treatment

	(wt.%)
N,N-Dimethyloctadecyloxypropylamine	4.0
Stearyl alcohol	11.0
Dipropylene glycol	5.0
Concentrated glycerin	5.0
Polypropylene glycol	2.5
Amphipathic amide lipid C	0.05
Amphipathic amide lipid D	0.1
Malic acid (50 wt.%)	1.0
Lactic acid (90 wt.%)	2.2

Sunflower oil	1.5
Benzyloxyethanol	1.0
Dipentaerythritol fatty acid ester	0.2
Oleic acid	0.1
Phenoxyethanol	0.1
Coconut oil fatty acid	0.1
Deionized water	Balance

[0090]

The above-described treatment (pH 3.2) was excellent in smoothness and moist feeling after drying and also in stability.

[0091]

[Advantage of the Invention]

The hair cosmetic compositions of the present invention can protect hair from physical or chemical stimulation to prevent split ends or broken hair and impart hair with a pleasant touch such as moist feeling, smoothness, and suppleness which healthy hair inherently possesses and are also excellent in storage stability.

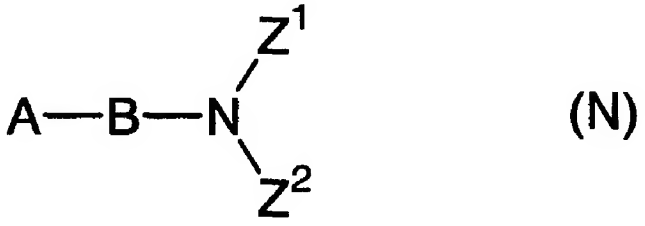
[Designation of Document] Abstract

[Abstract]

[Problem] To provide a hair cosmetic composition which can allow a protecting base incorporated therein to penetrate into hair sufficiently and is therefore excellent in effects of preventing or repairing hair damage.

[Means for Resolution] A hair cosmetic composition containing (A) an amphipathic amide lipid and (B) a tertiary amine type compound represented by the following formula (N):

[Chemical formula 1]



(N)

[wherein, A represents a hydrogen atom or an amide, (N-hydrocarbon)carbamoyl, acyloxy or hydrocarbonoxy group each having 12 to 24 carbon atoms in total, B represents a saturated or unsaturated divalent C_{1-22} hydrocarbon group, and Z^1 and Z^2 each independently represents a C_{1-4} alkyl group]; or a salt of the compound; and having a pH at 25°C of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[Selected Drawing] None

DECLARATION

I, Jun HAYASHI of c/o The Patent Corporate Body ARUGA PATENT OFFICE, 1-3-6, Nihonbashi Ningyocho, Chuo-ku, Tokyo 103-0013 Japan do solemnly and sincerely declare that I well understand both Japanese and English languages and that I believe the attached English version is true and complete translation of Japanese patent application No. 2002-375322 filed on December 25, 2002 in the name of Kao Corporation.

December 17, 2007

J. Hayashi

Jun HAYASHI

[Designation of Document] Specification

[Title of the Invention] Hair cosmetic composition

[Claims]

[Claim 1]

A hair cosmetic composition comprising the following components (A) to (C):

(A): an amphipathic amide lipid,

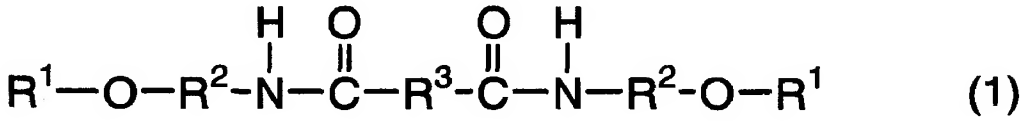
(B): a cationic surfactant, and

(C): a silicone, and having a pH of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[Claim 2]

A hair cosmetic composition of Claim 1, wherein Component (A) is an amphipathic amide lipid selected from compounds represented by the following formulas (1) to (4):

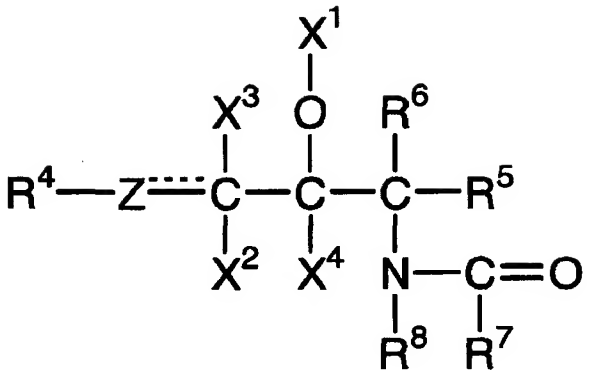
[Chemical formula 1]



$$R^1—O—R^2—\overset{\overset{H}{|}}{N}—\overset{\overset{O}{\|}}{C}—R^3—\overset{\overset{O}{\|}}{C}—\overset{\overset{H}{|}}{N}—R^2—O—R^1 \qquad (1)$$

[wherein, R^1 represents a linear or branched C_{1-12} hydrocarbon group which may be substituted with hydroxy and/or alkoxy group(s), R^2 represents a linear or branched divalent C_{1-5} hydrocarbon group, and R^3 represents a linear or branched divalent C_{1-22} hydrocarbon group],

[Chemical formula 2]

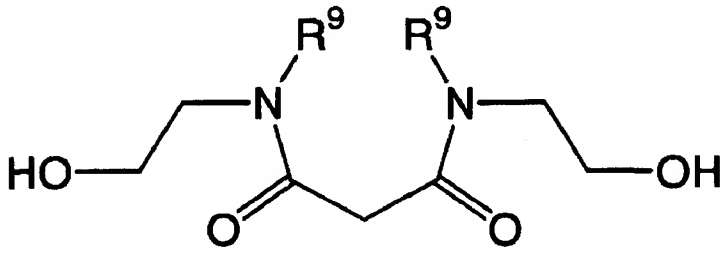


(2)

[wherein, R^4 represents a linear, branched or cyclic, saturated or unsaturated C_{4-30} hydrocarbon group which may be substituted with hydroxy, oxo or amino group(s), Z represents a methylene group, a methine group or an oxygen atom, a broken line represents the presence or absence of a π bond, X^1 represents a hydrogen atom, acetyl group or glyceryl group, or, together with the adjacent oxygen atom, forms an oxo group, X^2, X^3 and X^4 each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z represents a methine group, one of X^2 and X^3 represents a hydrogen atom and the other does not exist, and when $-O-X^1$ represents an oxo group, X^1 does not exist), R^5 and R^6 each independently represents a hydrogen atom, a hydroxy group, a hydroxymethyl group or an acetoxymethyl group, R^7 represents a linear, branched or cyclic, saturated C_{5-35} hydrocarbon group which may be substituted with hydroxy or amino group(s), or the saturated C_{5-35} hydrocarbon group in

which a linear, branched or cyclic, saturated or unsaturated C_{8-22} fatty acid which may be substituted with a hydroxy group is ester-bonded at the ω-position of the hydrocarbon group, and R^8 represents a hydrogen atom or a linear or branched, saturated or unsaturated hydrocarbon group which may have substituent(s) selected from a hydroxy group, hydroxyalkoxy groups, alkoxy groups and an acetoxy group and has 1 to 8 carbon atoms in total,

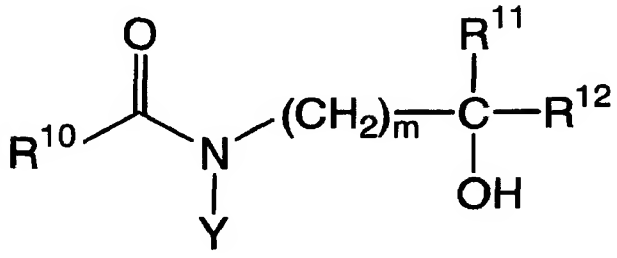
[Chemical formula 3]



(3)

[wherein, R^9 represents a C_{10-18} alkyl group which may be substituted with hydroxy group(s), and

[Chemical formula 4]

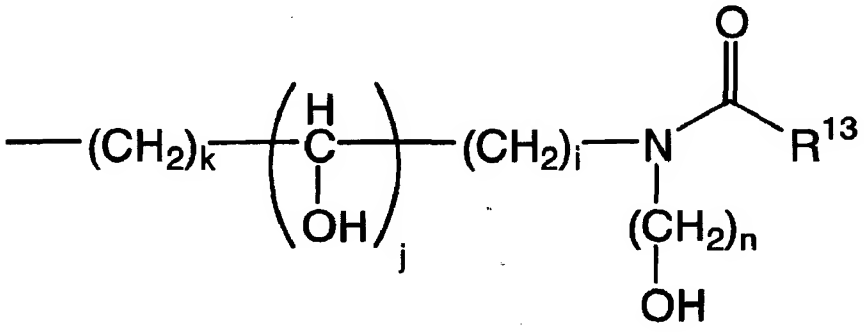


(4)

[wherein, R^{10} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with

hydroxy group(s), or a 2-dodecen-1-yl succinic acid residue, m stands for an integer from 1 to 3, R^{11} and R^{12} each represents a hydrogen atom or a C_{1-4} alkyl or hydroxyalkyl group, Y represents a linear or branched, saturated or unsaturated C_{10-32} alkyl group which may be substituted with hydroxy group(s), or a substituent represented by the following formula:

[Chemical formula 5]



(in which, k, i and n each stands for an integer from 1 to 3, j stands for 0 or 1, and R^{13} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s))].

[Claim 3]

The hair cosmetic composition of Claim 1 or 2, wherein the silicone is selected from the group consisting of dimethylpolysiloxane, polyether-modified silicones, and amino-modified silicones.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Belongs]

The present invention relates to hair cosmetic compositions capable of protecting hair from physical or chemical stimulation to prevent split ends or broken hair, capable of imparting hair with a pleasant touch such as moist feeling, smoothness, and suppleness which healthy hair inherently possesses, and excellent in storage stability.

[0002]

[Prior Art]

Since hair is daily exposed to physical stimulation by daily hair care routines such as heat drying with a hair dryer and brushing, and chemical stimulation by shampooing, permanent waving, dyeing and bleaching, it is in a damaged state with a partial loss of components or structure. A change in hair quality due to ageing accelerates this damage and also causes the loss of suppleness which healthy hair inherently possesses.

[0003]

It is a common practice to protect or repair hair in a damaged state by making up for the lost components or structure or analogue thereof. Interaction (affinity) between a protecting base and hair is considered to be important for developing a protecting or restoring function, and thus a method of using a sphingolipid or protein

derivative as a protecting base has been used widely as a useful technique. For example, proposed is a cationic dispersing agent for hair care or hair protection containing a ceramide or glycoceramide and a specific quaternary ammonium compound (refer to Patent Document 1). The agent however cannot contain a sufficient amount of a protecting base such as a ceramide or glycoceramide because it has a high melting point and is liable to crystallize. Moreover, this protecting base, though added in a slight amount, does not readily penetrate into hair. The conventional hair cosmetic composition is therefore accompanied by the problem that the protecting base incorporated therein cannot fully function, because it cannot be fed to hair in an adequate amount.

[0004]

In addition, it is difficult to incorporate the above-described protecting base stably in the hair cosmetic composition because it has a high melting point. There is also a problem that the protecting base is liable to cause separation, gelation or crystallization with the passage of time.

[0005]

[Patent Document 1]

Japanese Patent Laid-Open No. Hei 6-502660

[0006]

[Problems that the Invention is to Solve]

An object of the present invention is to provide a hair cosmetic composition which can allow a protecting base incorporated therein to penetrate into hair sufficiently, has excellent effects of preventing or repairing hair damage, and has excellent storage stability.

[0007]

[Means for Solving the Problems]

The present inventors have found that, by incorporating a cationic surfactant and a silicone in an amphipathic amide lipid serving as a protecting base and acidifying the system, the amphipathic amide lipid can readily penetrate into hair and the hair is protected from physical or chemical stimulation, whereby split ends or broken hair is prevented; hair is significantly imparted with a pleasant touch such as natural smoothness, moist feeling and suppleness which healthy hair inherently possesses; and the storage stability of the composition is greatly improved.

[0008]

In the present invention, there is thus provided a hair cosmetic composition comprising the following components (A) and (C):

(A) an amphipathic amide lipid,

(B) a cationic surfactant, and

(C) a silicone, and having a pH of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[0009]

[Mode for Carrying out the Invention]

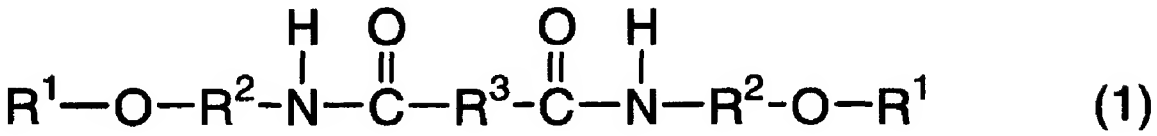
The amphipathic amide lipid as Component (A) has 1 or 2 amide groups; has, as a carbon chain bonded to the carbonyl group of the amide group, a C_{5-60} alkyl or alkylene group which may be substituted with a hydroxy group and may contain an ester bond in its main chain; and contains 1 to 5 hydroxy or C_{1-30} alkoxy groups in total. The following compounds (1) to (4) are specific examples of the amphipathic amide lipid.

[0010]

(1) Diamide compounds represented by formula (1):

[0011]

[Chemical formula 6]



$$R^1—O—R^2-\overset{\overset{H}{|}}{N}—\overset{\overset{O}{\|}}{C}—R^3-\overset{\overset{O}{\|}}{C}—\overset{\overset{H}{|}}{N}—R^2-O—R^1 \qquad (1)$$

[0012]

[wherein, R^1 represents a linear or branched C_{1-12} hydrocarbon group which may be substituted with hydroxy group(s) and/or alkoxy group(s), R^2 represents a linear or branched divalent C_{1-5} hydrocarbon group and R^3 represents a

linear or branched divalent C_{1-22} hydrocarbon group].

[0013]

As R^1 in the formula (1), linear or branched C_{1-12} alkyl groups which may be substituted with 1 to 3 groups selected from the class consisting of a hydroxy group and C_{1-6} alkoxy groups are preferred. Of these, unsubstituted C_{1-12} alkyl groups and C_{2-12} alkyl groups substituted with 1 or 2 hydroxy groups and one C_{1-6} alkoxy group or with one hydroxy group and one C_{1-6} alkoxy group are more preferred. Specific examples include methyl, ethyl, propyl, butyl, hexyl, dodecyl, 2-methylpropyl, 2-ethylhexyl, 2-hydroxyethyl, 9-hydroxynonyl, 2,3-dihydroxypropyl, 2-methoxyethyl, 2-hydroxy-3-methoxypropyl and 9-methoxynonyl groups, of which 2-hydroxyethyl, methyl, dodecyl and 2-methoxyethyl groups are preferred.

[0014]

As R^2 in the formula (1), linear or branched C_{2-5} alkylene groups, especially linear or branched C_{2-3} alkylene groups are preferred. Specific examples include ethylene, trimethylene, tetramethylene, pentamethylene, 1-methylethylene, 2-methylethylene, 1-methyltrimethylene, 2-methyltrimethylene, 1,1-dimethylethylene and 2-ethyltrimethylene groups. Of these, ethylene and trimethylene groups are preferred.

[0015]

As R^3 in the formula (1), linear or branched divalent C_{2-22} hydrocarbon groups are preferred, and linear or branched C_{11-22} alkylene groups and alkenylene groups having 1 to 4 double bonds are especially preferred. Specific examples include ethylene, trimethylene, tetramethylene, hexamethylene, heptamethylene, octamethylene, decamethylene, undecamethylene, dodecamethylene, tridecamethylene, tetradecamethylene, hexadecamethylene, octadecamethylene, 1-methylethylene, 2-ethyltrimethylene, 1-methylheptamethylene, 2-methylheptamethylene, 1-butylhexamethylene, 2-methyl-5-ethylheptamethylene, 2,3,6-trimethylheptamethylene, 6-ethyldecamethylene, 7-methyltetradecamethylene, 7-ethylhexadecamethylene, 7,12-dimethyloctadecamethylene, 8,11-dimethyloctadecamethylene, 7,10-dimethyl-7-ethylhexadecamethylene, 1-octadecylethylene, ethenylene, 1-octadecenylethylene, 7,11-octadecadienylene, 7-ethenyl-9-hexadecamethylene, 7,12-dimethyl-7,11-octadecadienylene and 8,11-dimethyl-7,11-octadecadienylene groups. Of these, 7,12-dimethyloctadecamethylene, 7,12-dimethyl-7,11-octadecadienylene, octadecamethylene, undecamethylene and tridecamethylene groups are especially preferred.

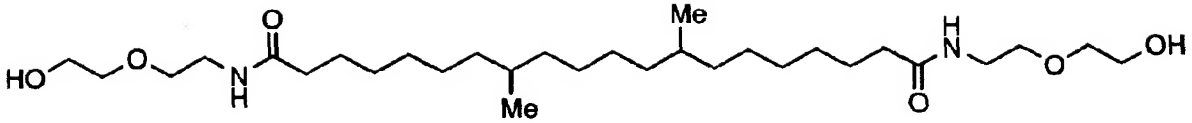
[0016]

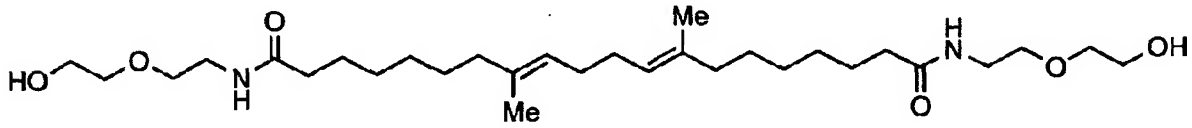
Especially preferred diamide compounds (1) are compounds having the above-described preferred groups as R^1,

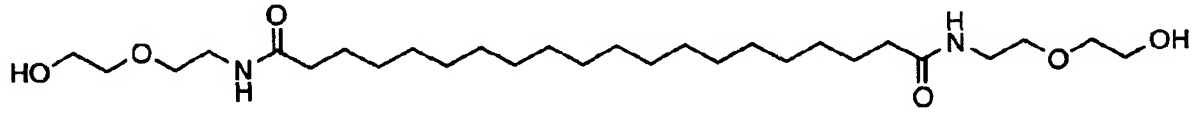
R^2 and R^3, respectively, in combination. Specific examples are the following compounds:

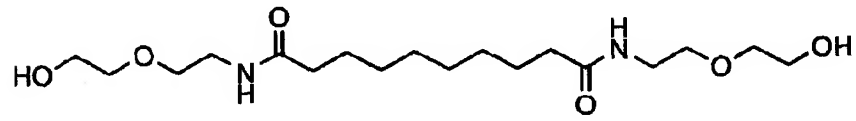
[0017]

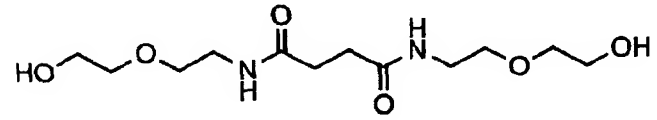
[Chemical formula 7]

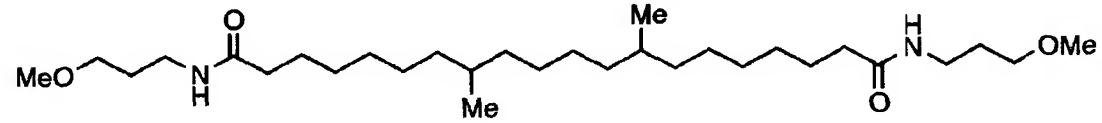


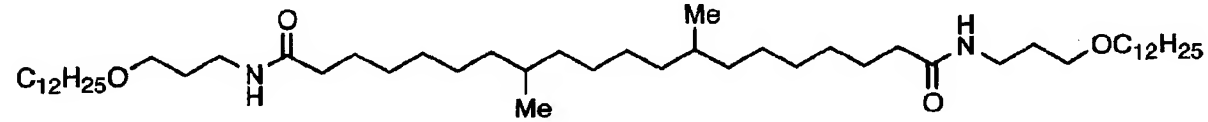


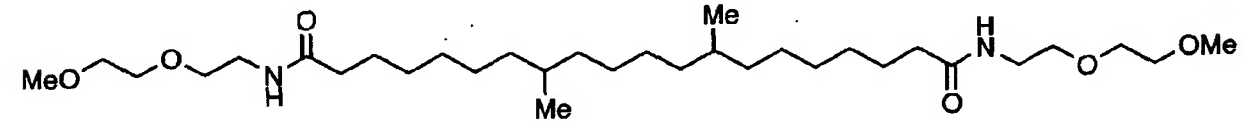


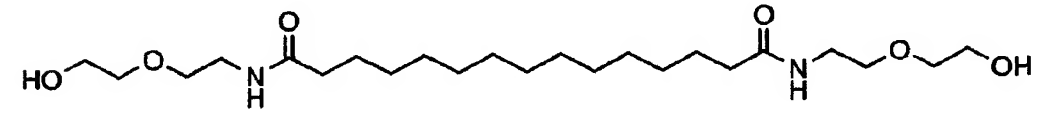


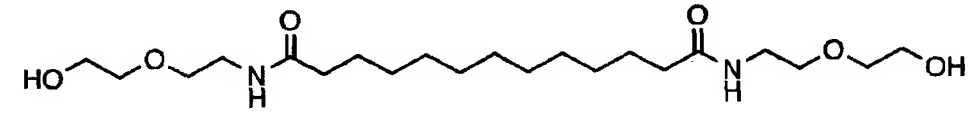


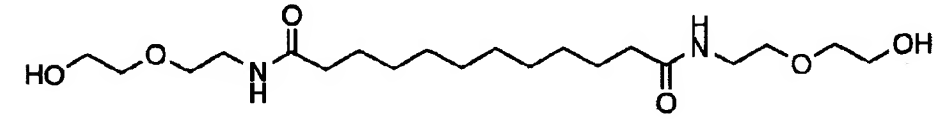






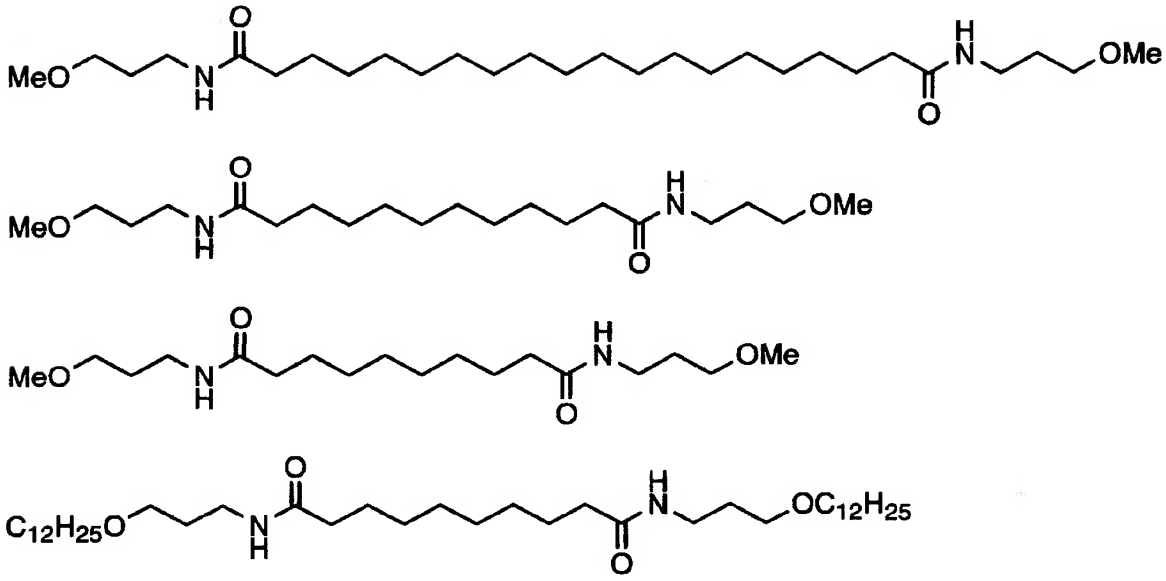






[0018]

[Chemical formula 8]

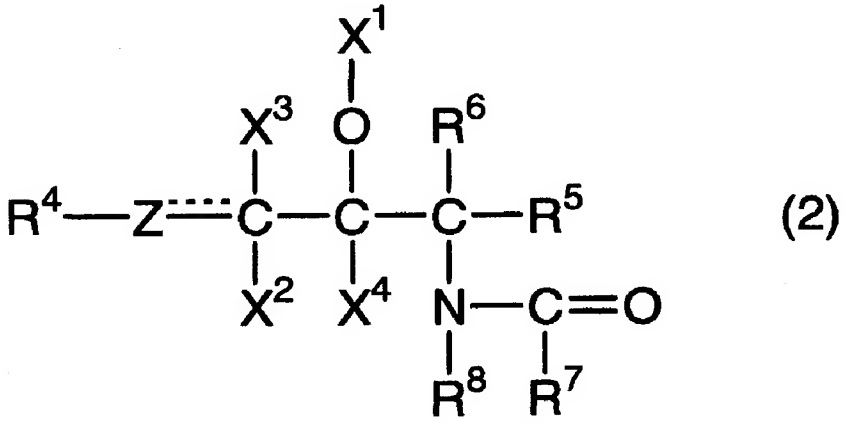


[0019]

(2) Ceramides represented by the following formula (2):

[0020]

[Chemical formula 9]



(2)

[0021]

[wherein, R^4 represents a linear, branched or cyclic, saturated or unsaturated C_{4-30} hydrocarbon group which may be substituted with hydroxy, oxo or amino group(s), Z represents a methylene group, a methine group or an oxygen atom, a broken line represents the presence or absence of a π bond, X^1 represents a hydrogen atom, an acetyl group or a glyceryl group, or, together with the adjacent oxygen atom, forms an oxo group, X^2, X^3 and X^4 each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z represents a methine group, one of X^2 and X^3 represents a hydrogen atom and the other does not exist, and when $-O-X^1$ represents an oxo group, X^1 does not exist), R^5 and R^6 each independently represents a hydrogen atom, a hydroxy group, a hydroxymethyl group or an acetoxymethyl group, R^7 represents a linear, branched or cyclic, saturated C_{5-35} hydrocarbon group which may be substituted with a hydroxy or amino group, or the saturated C_{5-35} hydrocarbon group in which a linear, branched or cyclic, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-position of the hydrocarbon group, and R^8 represents a hydrogen atom or a linear or branched, saturated or unsaturated hydrocarbon group which may have substituent(s) selected from a hydroxy group, hydroxyalkoxy groups, alkoxy groups and an acetoxy

group, and has 1 to 8 carbon atoms in total].

[0022]

As R^4 in the formula (2), linear, branched or cyclic, saturated or unsaturated C_{7-22} hydrocarbon groups which may be substituted with hydroxy group(s) are preferred. As X^1, a hydrogen atom and a glyceryl group are preferred. It is preferred that none or one of X^2, X^3, and X^4 represents a hydroxy group and the others represent a hydrogen atom. It is preferred that one of R^5 and R^6 represents a hydrogen atom or a hydroxymethyl group and the other one represents a hydrogen atom. In R^7, preferred examples of the fatty acid which may be ester-bonded or amide-bonded to the saturated hydrocarbon group at the ω-position thereof include isostearic acid, 12-hydroxystearic acid and linoleic acid. As R^8, a hydrogen atom and hydrocarbon groups which may be substituted with 1 to 3 substituents selected from the class consisting of a hydroxy group, hydroxyalkoxy groups and alkoxy groups and have 1 to 8 carbon atoms in total are preferred.

[0023]

As the ceramide (2), preferred are the following compounds (2a) and (2b).

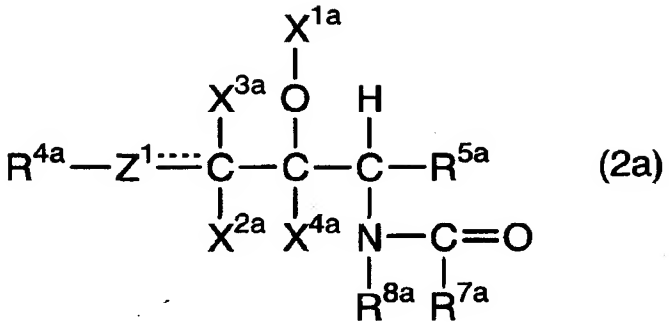
[0024]

(2a) Natural ceramides or natural type ceramides represented by the following formula (2a), and derivatives

thereof (which will hereinafter be called "natural type ceramides")

[0025]

[Chemical formula 10]



(2a)

[0026]

[wherein, R^{4a} represents a linear, branched or cyclic, saturated or unsaturated C_{7-19} hydrocarbon group which may be substituted with a hydroxy group, Z^1 represents a methylene or methine group, a broken line represents the presence or absence of a π bond, X^{1a} represents a hydrogen atom or, together with the adjacent oxygen atom, forms an oxo group, X^{2a}, X^{3a} and X^{4a} each independently represents a hydrogen atom, a hydroxy group or an acetoxy group (with the proviso that when Z^1 represents a methine group, one of X^{2a} and X^{3a} represents a hydrogen atom and the other does not exist, and when $-O-X^{1a}$ represents an oxo group, X^{4a} does not exist), R^{5a} represents a hydroxymethyl group or an acetoxymethyl group, R^{7a} represents a linear, branched or cyclic, saturated C_{5-30} hydrocarbon group which may be

substituted with hydroxy group(s), or the saturated C_{5-30} hydrocarbon group in which a linear or branched, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-end of the alkyl group, and R^{8a} represents a hydrogen atom or a C_{1-4} alkyl group].

[0027]

Preferred are compounds in which R^{4a} is a linear C_{7-19}, more preferably C_{13-15} alkyl group, Z^1 is a methine group, one of X^{2a} and X^{3a} is a hydrogen atom, and R^{7a} is a linear C_{9-27} alkyl group which may be substituted with hydroxy group(s). In addition, X^{1a} preferably represents a hydrogen atom or, together with an oxygen atom, forms an oxo group. More preferred examples of R^{7a} include a tricosyl group, a 1-hydroxypentadecyl group, a 1-hydroxytricosyl group, a heptadecyl group, a 1-hydroxyundecyl group and a nonacosyl group having a linoleic acid ester-bonded at the ω-position of the group.

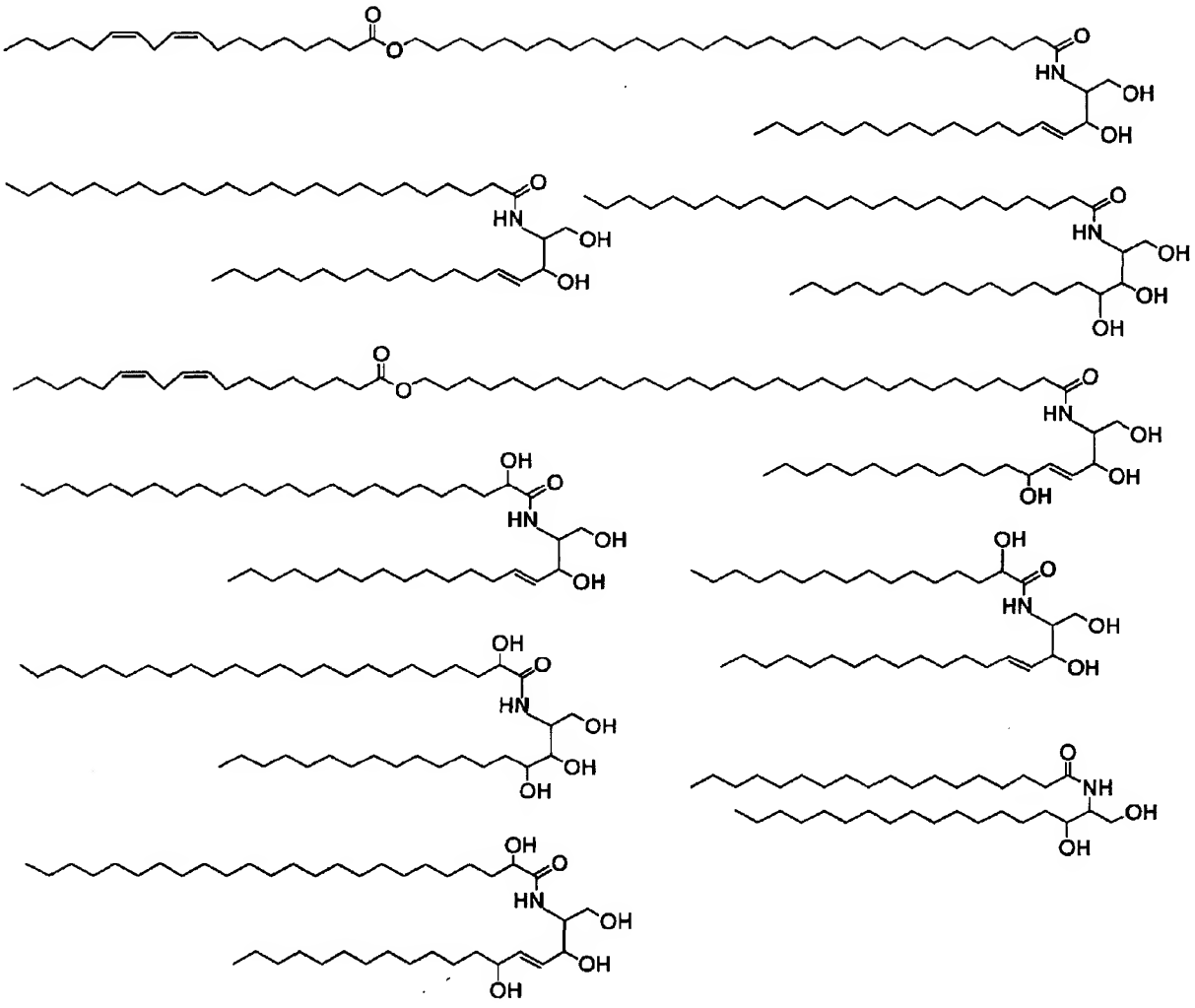
[0028]

Specific examples of the natural type ceramides include Ceramide Types 1 to 7 having the below-described structures and obtained by amidation of sphingosine, dihydrosphingosine, phytosphingosine or sphingadienine (for example, FIG. 2 of *J. Lipid Res.*, 24, 759(1983), and pig and human ceramides as described in FIG. 4 of *J. Lipid Res.*,

35, 2069(1994)).

[0029]

[Chemical formula 11]



[0030]

Examples also include N-alkyl derivatives (for example, N-methyl derivatives) of the above-described ceramides. They may be either a natural extract or synthesized product. Commercially available ones are also

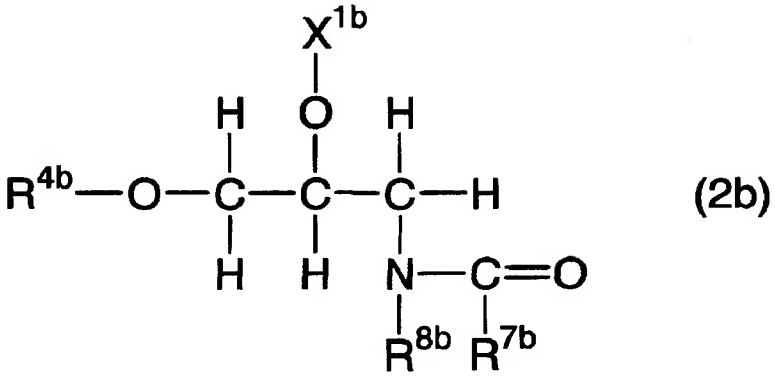
usable.

[0031]

(2b) Pseudo type ceramides represented by the following formula (2b):

[0032]

[Chemical formula 12]



(2b)

[0033]

[wherein, R^{4b} represents a linear, branched or cyclic, saturated or unsaturated C_{10-22} hydrocarbon group which may be substituted with hydroxy group(s), X^{1b} represents a hydrogen atom, an acetyl group or a glyceryl group, R^{7b} represents a linear, branched or cyclic, saturated or unsaturated C_{5-22} hydrocarbon group which may be substituted with hydroxy or amino group(s), or the saturated or unsaturated C_{5-22} hydrocarbon group in which a linear or branched, saturated or unsaturated C_{8-22} fatty acid which may be substituted with hydroxy group(s) is ester-bonded at the ω-end of the hydrocarbon group, and R^{8b} represents a

hydrogen atom or an alkyl group which may be substituted with hydroxy group(s), hydroxyalkoxy group(s), alkoxy group(s) or acetoxy group(s) and has 1 to 8 carbon atoms in total].

[0034]

Preferred as R^{7b} are a nonyl group, a tridecyl group, a pentadecyl group, an undecyl group having linoleic acid ester-bonded at the ω-position of the group, a pentadecyl group having linoleic acid ester-bonded at the ω-position of the group, a pentadecyl group having 12-hydroxystearic acid ester-bonded at the ω-position of the group, and an undecyl group having methyl-branched isostearic acid amide-bonded at the ω-position of the group. As the hydroxyalkoxy or alkoxy groups for R^{8b}, preferred are those having 1 to 8 carbon atoms.

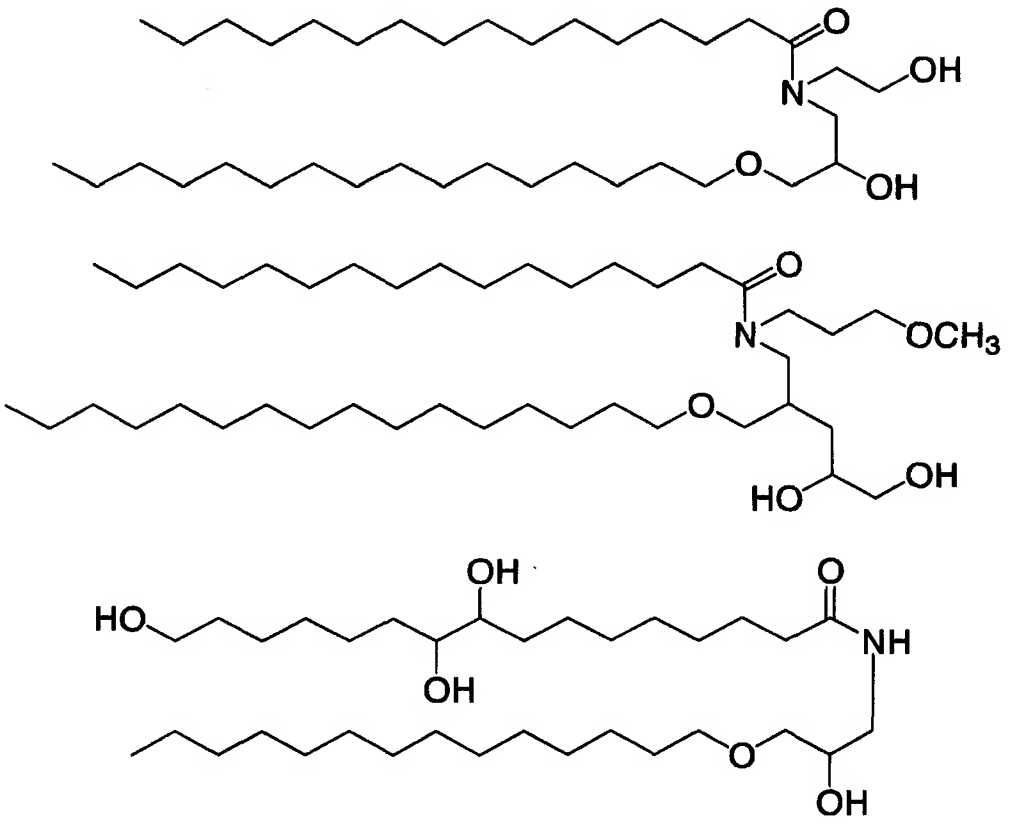
[0035]

As the pseudo type ceramides (2b), those having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a pentadecyl group, and as R^{8b} a hydroxyethyl group; those having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a nonyl group, and as R^{8b} a hydroxyethyl group; or those having as R^{4b} a hexadecyl group, as X^{1b} a glyceryl group, as R^{7b} a tridecyl group, and as R^{8b} a 3-methoxypropyl group are preferred, with those (2b) having as R^{4b} a hexadecyl group, as X^{1b} a hydrogen atom, as R^{7b} a pentadecyl group, and as R^{8b}

a hydroxyethyl group being especially preferred. Specific preferred examples include those represented by the following formulas:

[0036]

[Chemical formula 13]

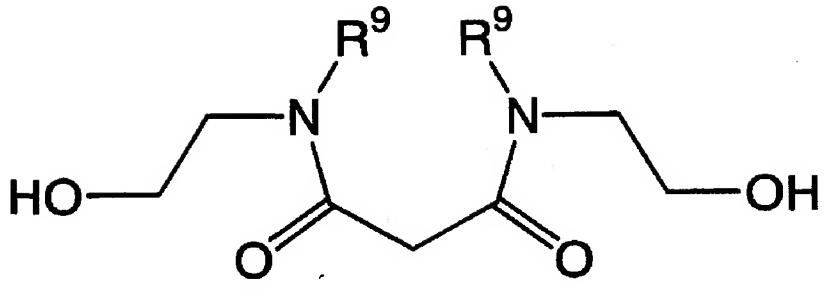


[0037]

(3) Diamide compounds represented by the following formula (3):

[0038]

[Chemical formula 14]



(3)

[0039]

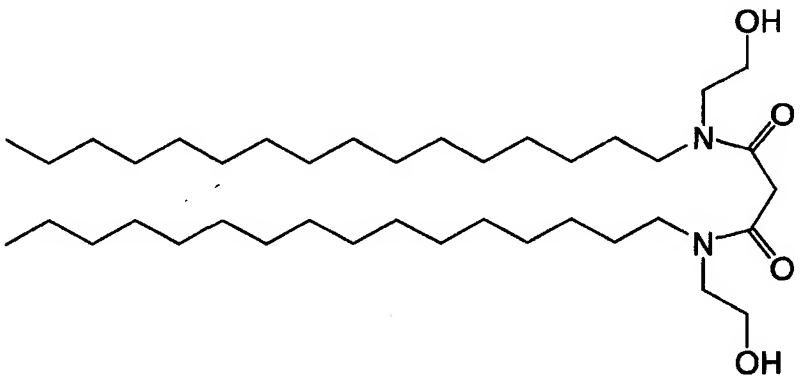
[wherein, R^9 represents a C_{10-18} alkyl group which may be substituted with hydroxy group(s)].

[0040]

Specific examples of compound (3) include the compound represented by the following formula:

[0041]

[Chemical formula 15]

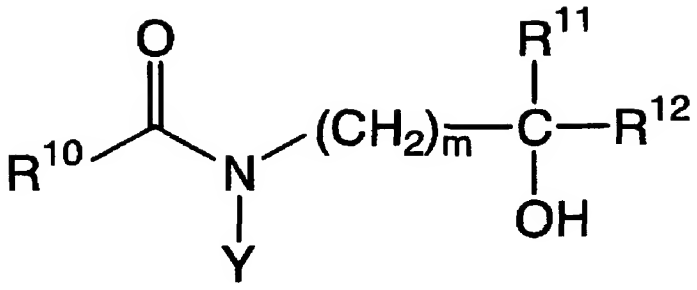


[0042]

(4) Amide compounds represented by the following formula (4):

[0043]

[Chemical formula 16]



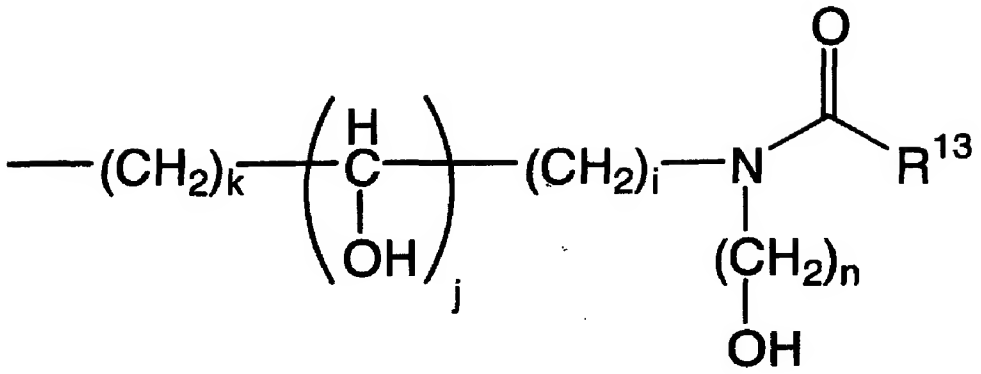
(4)

[0044]

[wherein, R^{10} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s), or a 2-dodecen-1-yl succinic acid residue, m stands for an integer from 1 to 3, R^{11} and R^{12} each represents a hydrogen atom or a C_{1-4} alkyl or hydroxyalkyl group, Y represents a linear or branched, saturated or unsaturated C_{10-32} alkyl group which may be substituted with hydroxy group(s), or a substituent represented by the following formula:

[0045]

[Chemical formula 17]



[0046]

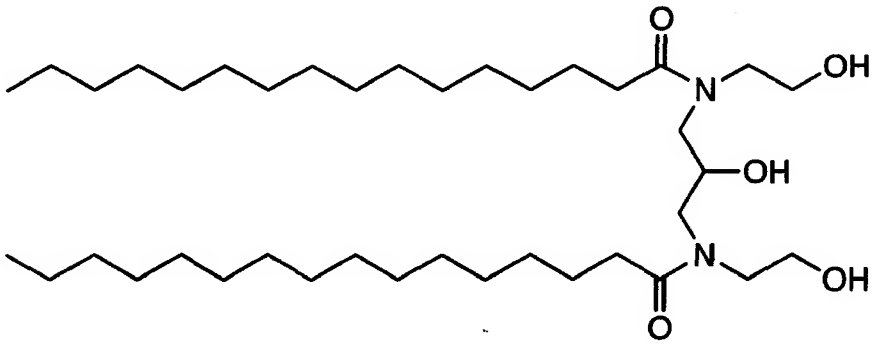
(in which, k, i and n each stands for an integer from 1 to 3, j stands for 0 or 1, and R^{13} represents a linear or branched, saturated or unsaturated C_{9-31} alkyl group which may be substituted with hydroxy group(s))].

[0047]

Specific examples of Compound (4) include a compound represented by the following formula:

[0048]

[Chemical formula 18]



[0049]

As Component (A), two or more of these amphipathic

amide lipids may be used in combination. Its (their) content in the hair cosmetic composition of the present invention is preferably from 0.001 to 20 wt.%, more preferably from 0.15 to 5 wt.%, especially preferably from 0.2 to 3 wt.% in view of imparting suppleness to hair and preventing split ends or breakage of hair.

[0050]

Examples of cationic surfactant (B) include lauryl trimethylammonium chloride, cetyl trimethylammonium chloride, cetyl trimethylammonium bromide, stearyl trimethylammonium chloride, stearyl trimethylammonium bromide, lauryl trimethylammonium bromide, dialkyl dimethylammonium chlorides, dicetyl dimethylammonium chloride, distearyl dimethylammonium chloride, dicocoyl dimethylammonium chloride, myristyl dimethylbenzylammonium chloride, stearyl dimethylbenzylammonium chloride, lanolin fatty acid aminopropylethyldimethylammonium ethylsulfate, lanolin fatty acid aminoethyltriethylammonium ethylsulfate, lanolin fatty acid aminoethyldiethylmethylammonium ethylsulfate, lanolin fatty acid aminoethyltrimethylammonium ethylsulfate, lanolin fatty acid aminopropyltriethylammonium ethylsulfate, lanolin fatty acid aminoethyltrimethylammonium methylsulfate, lanolin fatty acid aminopropylethyldimethylammonium methylsulfate, isoalkanoic acid (C14 to C20)

aminopropylethyldimethylammonium ethylsulfates, isoalkanoic acid (C_{18} to C_{22}) aminopropylethyldimethylammonium ethylsulfates, isostearic acid aminopropylethyldimethylammonium ethylsulfate, isononanoic acid aminopropylethyldimethylammonium ethylsulfate and alkyltrimethylammonium saccharines.

[0051]

As Component (B), two or more of the above-described cationic surfactants may be used in combination. Its (their) content in the hair cosmetic composition of the present invention is preferably from 0.1 to 20 wt.%, more preferably from 0.5 to 5 wt.%, especially preferably from 1 to 8 wt.% in view of improving the feeling to the touch during from application to rinsing and stability of the system.

[0052]

Examples of the silicone as Component (C) include dimethylpolysiloxane, polyether-modified silicones, amino-modified silicones, carboxy-modified silicones, methylphenylpolysiloxane, fatty acid-modified silicones, aliphatic alcohol-modified silicones, epoxy-modified silicones, fluorine-modified silicones, cyclic silicones, and alkyl-modified silicones. Of these, dimethylpolysiloxanes, polyether-modified silicones, and amino-modified silicones are preferred. Use of a

dimethylpolysiloxane, a polyether-modified silicone and an amino-modified silicone can impart hair with good lubricity, smoothness and moist feeling, respectively. As the dimethylpolysiloxanes, those having a viscosity of from 5 mm^2/s to 10 million mm^2/s can be used depending on the intended feeling to the touch, wherein those having a viscosity of 10 million mm^2/s are often supplied in the form of an emulsion. Of these, those having a viscosity falling within a range of from 5000 mm^2/s to 10 million mm^2/s are preferred, and those having a viscosity of from 50000 mm^2/s to 10 million mm^2/s are especially preferred. The term "polyether-modified silicones" is a generic name of polyoxyethylene-methylpolysiloxane copolymers and poly(oxyethylene-oxypropylene)methylpolysiloxane copolymers Those having various HLBs are known. Examples of the commercially available products thereof include "Silicone KF351A", "Silicone KF353A", "Silicone KF6008", "Silicone KF6016", "Silicone KF6011", and "Silicone KF6012" (each, product of Shin-etsu Chemical Co., Ltd.), "DC8500" (product of Dow Corning Corporation), and "SH3771C, "SH3773C", and "SH3775C" (each, product of Dow Corning Toray Silicone Co., Ltd.). The polyether-modified silicones may preferably have an HLB of from 4 to 18, more preferably from 7 to 11, as measured by the Griffin method. As the amino-modified silicones, amodimethicone oil or an emulsion thereof is

usable. Their commercially available products include amodimethicone emulsion "SM8704C" (product of Dow Corning Toray Silicone Co., Ltd.) and "XF-42B1989" (product of GE Toshiba Silicones).

[0053]

As Component (C), two or more of the above-described silicones may be used in combination, and its (or their) content in the hair cosmetic composition of the present invention is preferably from 0.005 to 10 wt.%, more preferably from 0.01 to 5 wt.%, especially preferably from 1 to 3 wt.%.

[0054]

The silicones as Component (C) are each dispersed in the hair cosmetic composition, and their average particle size is preferably from 0.001 to 200 μm. From the viewpoint of the stability of the composition, the average particle size is preferably from 0.001 to 10 μm, especially preferably from 0.1 to 5 μm. From the viewpoint of improving the feeling to the touch during hair drying, the average particle size is preferably from 50 to 150 μm, especially preferably from 80 to 120 μm.

[0055]

For the purpose of stabilization of the hair cosmetic composition, improvement in the feeling upon use, viscosity regulation, and solubilization and dispersion-

emulsification of various bases, a surfactant other than Component (B), that is, an amphoteric or nonionic surfactant may be incorporated in the hair cosmetic composition of the present invention.

[0056]

As the amphoteric surfactant, carbobetaines having a C_{8-24} alkyl, alkenyl or acyl group, amidobetaines, sulfobetaines, hydroxysulfobetaines, amidosulfobetaines, phosphobetaines and imidazolinium are usable. Counterions of the anionic group of these amphoteric surfactants include hydrogen ions, alkali metal ions, alkaline earth metal ions, ammonium ions and alkanolamine ions, while counterions of the cationic group include halide ions, methosulfate ions, and saccharinate ions.

[0057]

Preferred amphoteric surfactants include laurylamidopropyl betaine ("AMPHITOL 20AB"; product of Kao Corp.), cocoylamidopropyl betaine ("AMPHITOL 55AB"; product of Kao Corp.), lauryldimethylaminoacetic acid betaine ("AMPHITOL 20BS"; product of Kao Corp.), laurylhydroxysulfobetaine ("AMPHITOL 20H"; product of Kao Corp.), and 2-alkyl-N-carboxymethyl-N-hydroxyethylimidazolinium betaines such as sodium cocoamphoacetate ("AMPHITOL 20YN"; product of Kao Corp.), sodium cocoamphopropionate ("AMPHITOL 20X, Y-B"; product of

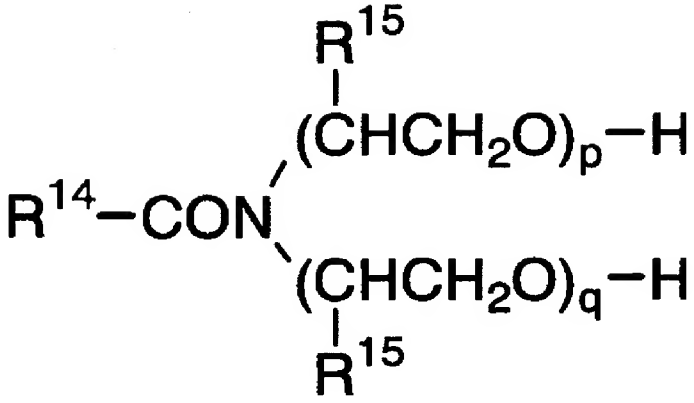
Kao Corp.) and sodium N-cocoyl acyl-N-carboxyethyl-N-hydroxyethyl ethylenediamine ("Softazoline NS"; product of Kao Corp).

[0058]

Examples of the nonionic surfactant include polyoxyalkylene alkyl (or alkenyl) ethers added with 1 to 20 moles of EO, PO or butylene oxides (which will hereinafter be abbreviated as "BO") and having an alkyl or alkenyl group with 10 to 20 carbon atoms on average, polyoxyalkylene alkyl phenyl ethers added with 1 to 20 moles of EO or PO and having an alkyl group with 6 to 12 carbon atoms on average, polyoxyalkylene alkyl (or alkenyl) ethers added with 1 to 30 moles, in total, of EO and PO or EO and BO (an EO/PO or EO/BO ratio ranging from 0.1/9.9 to 9.9/0.1) and having an alkyl or alkenyl group with 10 to 20 carbon atoms on average, higher fatty acid alkanolamides represented by the following formula (5):

[0059]

[Chemical formula 19]



(5)

[0060]

[wherein, R^{14} represents a C_{7-21} alkyl or alkenyl group, R^{15} represents a hydrogen atom or a methyl group, p stands for an integer of from 1 to 3 and q stands for an integer of from 0 to 3],

[0061]

or alkylene oxide adducts thereof, sucrose fatty acid esters composed of a fatty acid having 10 to 20 carbon atoms on average and sucrose, and glycerin fatty acid monoesters composed of a fatty acid having 10 to 20 carbon atoms on average and glycerin.

[0062]

Two or more of these surfactants may be used in combination. Its (or their) content in the whole composition is preferably from 0.1 to 20 wt.%. For obtaining a greater effect, 0.5 to 15 wt.% is more preferred, with 1 to 10 wt.% being especially preferred.

[0063]

To the hair cosmetic composition of the present invention, proteins ordinarily employed as a hair protecting component can be added in order to further enhance effects of preventing split ends and broken hair.

[0064]

The term "proteins" embraces proteins, protein hydrolysates and derivatives thereof and they can be extracted or derived from animals or plants. Proteins derived from animals include keratin, elastin, collagen, lactoferrin, casein, α(β)-lactalbumin, globulins, egg albumin and hydrolysates thereof. Of these, keratin, elastin, collagen and casein, and hydrolysates thereof are preferred. Examples of the protein derived from plants include extracts from wheat, malt, oat, barley, corn, rice, soybean, broad bean, silk, seeds of lupine, potatoes, and apricot kernel, and hydrolysates thereof. Of these, proteins from wheat, soybean and silk, and hydrolysates thereof are preferred. As the protein, two or more of the above-described ones may be used in combination, and its (or their) content in the whole composition is preferably from 0.01 to 5 wt.%, more preferably from 0.05 to 4 wt.%, especially preferably from 0.1 to 3 wt.%.

[0065]

To the hair cosmetic composition of the present

invention, a cationic polymer conventionally employed as a component for improving the feeling to the touch may be added in order to further improve the feeling upon use.

[0066]

Examples of the cationic polymer include polydimethyldiallylammonium chlorides, acrylamidopropyltrimethylammonium chloride/acrylate copolymers, acrylamide/dimethyldiallylammonium chloride copolymers, methylvinylimidazolinium chloride/vinylpyrrolidone copolymers, hydroxyethyl cellulose/diallyldimethylammonium chloride copolymers, diethylsulfates of vinylpyrrolidone/dimethylaminoethyl methacrylate copolymers, vinylpyrrolidone/dimethylaminoethylmethyl methacrylate copolymers, vinylpyrrolidone/alkylaminoacrylate/vinylcaprolactam copolymers, vinylpyrrolidone/dimethylaminopropylmethacrylamide copolymers, chlorinated O-[2-hydroxy-3-(trimethylammonio)propyl]hydroxy cellulose, and guar hydroxypropyltrimonium chloride. Two or more of these cationic polymers may be used in combination. Its (or their) content in the whole composition is, as a solid content, preferably from 0.01 to 20 wt.%, more preferably from 0.05 to 10 wt.%, especially preferably from 0.1 to 5

wt.%.

[0067]

The hair cosmetic composition of the present invention can contain, in addition to the above-described components, oil components such as cholesterol and derivatives thereof, petrolatum, lanolin derivatives, and fatty acid esters of polyethylene glycol; high molecular emulsifiers such as polycarboxylic acids, crosslinked carboxylic acid/carboxylate copolymers, crosslinked acrylic acid/acrylate copolymers and acrylamide/butanesulfonic acrylamide copolymers; polyhydric alcohols such as glycerin and sorbitol; humectants; chelating agents such as ethylenediaminetetraacetic acid (EDTA); drugs such as vitamin preparations; amino acids and derivatives thereof; fine particles of a polymer such as polyethylene, polystyrene, poly(methyl methacrylate), nylon or silicone, and hydrophobic products thereof; extracts from animals or plants; ultraviolet absorbers; pearling agents; antiseptics; bactericides; anti-inflammatory agents; anti-dandruffs; pH regulators; colorants; and fragrances, according to the intended use.

[0068]

The hair cosmetic composition of the present invention can be classified into those used in bath rooms such as hair conditioners, hair treatments and hair packs,

and styling agents used outside bath rooms such as hair milks, hair creams and hair waxes.

[0069]

The hair cosmetic composition of the present invention is adjusted to a pH of from 1 to 4.5 when applied to hair (i.e. when diluted with water to 20 times the weight of the composition) in view of allowing Component (A) (amphipathic amide lipid) to penetrate into hair sufficiently while suppressing stimulation. The pH is more preferably from 2 to 4, with pH from 3 to 3.8 being especially preferred.

[0070]

The hair cosmetic composition of the present invention can be provided in any form such as liquid, powder, gel and granule as needed. A liquid composition using water or a lower alcohol as a solvent is preferred, with an aqueous solution being especially preferred.

[0071]

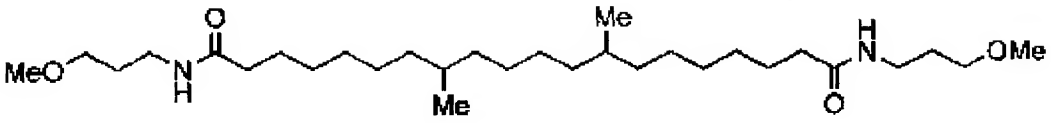
[Examples]

In the below-described Examples and Comparative Examples, the following amphipathic amide lipids were employed.

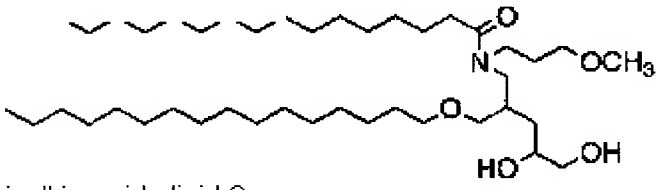
[0072]

[Chemical formula 20]

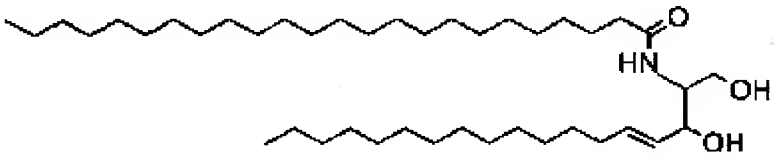
Amphiphathic amide lipid A



Amphipathic amide lipid B

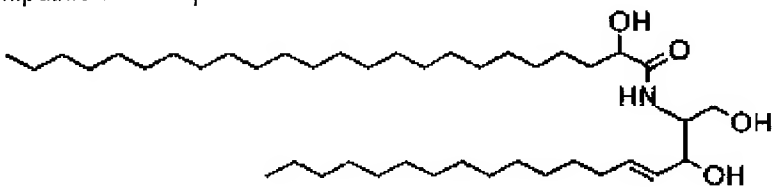


Amphipathic amide lipid C



Ceramide 2

Amphipathic amide lipid D



Ceramide 5

[0073]

Examples 1 to 3, and Comparative Examples 1 to 3

Hair conditioners as shown in Table 1 were prepared in a conventional manner and evaluated.

[0074]

(1) Smoothness and Moist feeling

About 20 g (about 15 cm to 20 cm in length) of the hair of a Japanese female which hair had not yet been subjected to any chemical treatment such as permanent waving or hair dyeing was treated twice with "Lavenus High Bleach" (product of Kao Corp.) at 40°C for 20 minutes (at a

bath ratio of 1:1). After shampooing, 2 g of the hair conditioner shown in Table 1 was uniformly applied to the hair, rinsed with running water for 30 seconds and then dried with a dryer. The "smoothness" and "moist feeling" of the dried hair was organoleptically evaluated in accordance with the following criteria:

[0075]

Smoothness:

A: The hair is imparted with natural and sufficient smoothness.

B: The hair is imparted with smoothness.

C: It is difficult to evaluate whether the hair is imparted with smoothness or not.

D: Friction appears among individual hairs.

[0076]

Moist feeling:

A: The hair becomes very moist to the touch.

B: The hair becomes moist to the touch.

C: It is difficult to evaluate whether the hair becomes moist to the touch or not.

D: The hair does not become moist to the touch.

[0077]

(2) Effects of preventing split ends and breakage of hair

About 20 g (about 15 to 20 cm long) of the hair of a Japanese female, which had not been subjected to any

chemical treatment such as permanent waving and hair dyeing, was treated with "LAVENUS Pure Color Neo Red Nuance" (product of Kao Corporation) (bath ratio 1:1) at room temperature for 20 minutes. The hair thus treated was then cleansed with a plain shampoo and a plain rinse. The plain shampoo and plain rinse used here have the following compositions, respectively:

[0078]

·Plain Shampoo

	(wt.%)
A (25 wt.%) solution of sodium polyoxyethylene (2.5) lauryl ether sulfate	62.00
Lauric acid diethanolamide	2.28
Disodium edetate	0.10
Sodium benzoate	0.50
Oxybenzone	0.03
Phosphoric acid (75 wt.%)	0.10
Dibutylhydroxytoluene	0.01
Sodium chloride	0.80
Red No. 106	0.00012
Fragrance	0.26
Purified water	Balance

[0079]

·Plain Rinse

(wt.%)

Stearyltrimethylammonium chloride (28 wt.%)	2.7
Distearyldimethylammonium chloride	3.6
Cetanol	2.0
Propylene glycol	5.0
Methyl p-hydroxybenzoate	0.1
Deionized water	Balance

[0080]

The hair bundle subjected to the above-described cleansing treatment was treated once with the conditioner shown in Table 1 and after drying, was brushed predetermined times (100 times/min × 90 minutes) at 25 to 27°C and at 21 to 25% RH. Generation of split ends after brushing was evaluated in accordance with the below-described criteria in comparison with that before brushing.

[0081]

A: An increase in split ends or breakage of the hair is not recognized.

B: An increase in split ends or breakage of the hair is scarcely recognized.

C: A slight increase in split ends or breakage of the hair is recognized.

D: An increase in split ends or breakage of the hair is recognized.

[0082]

(3) Storage stability

In a clear glass bottle, 100 mL of each sample was filled and an accelerated stability test was performed in an incubator (storage temperature of 50°C × 1 month). After completion of the storage term, the bottle was taken out from the incubator and allowed to stand at room temperature for at least 30 minutes. Then, the appearance of the sample was evaluated in accordance with the below-described criteria:

[0083]

A: no change

B: a slight change (for example, creaming or slight discoloration)

C: an apparent change (for example, separation or gelation)

[0084]

[Table 1]

(wt.%)

		Examples			Comparative Examples		
		1	2	3	1	2	3
(A)	Amphipathic amide lipid A	2	2	-	2	-	2
	Amphipathic amide lipid B	-	-	2	-	-	-
(B)	Stearyltrimethylammonium chloride	3	3	3	3	3	3
(C)	Dimethylpolysiloxane emulsion *1	2	2	-	-	2	-
	Amino-modified silicone *2	-	0.5	0.5	-	-	0.05
Others	Behenyl alcohol	8	8	8	8	8	8
	Dipropylene glycol	0.5	0.5	0.5	0.5	0.5	0.5
	Benzyloxy ethanol	0.3	0.3	0.3	0.3	0.3	0.3
	Phenoxy ethanol	0.5	0.5	0.5	0.5	0.5	0.5
	PH regulator (sodium hydroxide, citric acid)	q.s. *3	q.s. *3	q.s. *3	q.s. *3	q.s. *3	q.s. *3
	Purified water	Balance	Balance	Balance	Balance	Balance	Balance

pH		3.5	3.5	3.5	3.5	3.5	7
Evaluation	Smoothness of hair	A	A	A	C	C	B
	Moist feeling of hair	A	A	A	B	C	C
	Prevention of split ends or breakage of hair	A	A	B	B	C	C
	Storage stability	B	B	B	B	B	D

*1: "CF-2460" (product of Dow Corning Toray Silicone, a 75 wt.% emulsion, average particle size: about 100 μm)

*2: "SM8704C" (product of Dow Corning Toray Silicone, a 40 wt.% emulsion, average particle size: about 0.5 μm)

*3: An amount to adjust the pH

[0085]

Example 4: Hair Conditioner

	(wt.%)
Stearyltrimethylammonium chloride	3.0
Behenyl alcohol	8.0
Dipropylene glycol	5.0
Concentrated glycerin	5.0
Polypropylene glycol	2.5
Amphipathic amide lipid A	0.2
Dimethicone-containing emulsion ("CF-2460"; product of Dow Corning Toray Silicone, a 75 wt.% emulsion, average particle size: about 100 μm)	2.0
Malic acid (50 wt.%)	1.0
Lactic acid (90 wt.%)	1.7
Sunflower oil	0.5
Benzyloxyethanol	1.0
Dipentaerythritol fatty acid ester	0.1

Phenoxyethanol	0.1
Deionized water	Balance

[0086]

The above-described conditioner (pH 3.1) was excellent in smoothness during rinsing, in smoothness and moist feel after drying and also in stability.

[0087]

Example 5: Hair treatment

	(wt.%)
N,N-Dimethyloctadecyloxypropylamine	6.0
Behenyl alcohol	15.0
Dipropylene glycol	5.0
Concentrated glycerin	5.0
Propylene glycol	2.5
Amphipathic amide lipid C	0.05
Amphipathic amide lipid D	0.1
Dimethicone-containing emulsion ("CF-2460"; product of Dow Corning Toray Silicone, a 75 wt.% emulsion, average particle size: about 100 μm)	2.5
Amodimethicone-containing emulsion ("SM8704C"; product of Dow Corning Toray Silicone, a 40 wt.% emulsion, average particle size: about 0.5 μm)	0.2
Malic acid (50 wt.%)	1.0

Lactic acid (90 wt.%)	2.2
Sunflower oil	1.5
Benzyloxyethanol	1.0
Dipentaerythritol fatty acid ester	0.2
Oleic cid	0.1
Phenoxyethanol	0.5
Coconut oil fatty acid	0.1
Deionized water	Balance

[0088]

The above-described treatment (pH 3.2) was excellent in smoothness and moist feeling after drying and also in stability.

[0089]

[Advantage of the Invention]

The hair cosmetic compositions of the present invention can protect hair from physical or chemical stimulation to prevent split ends or broken hair and impart hair with a pleasant touch such as moist feeling, smoothness, and suppleness which healthy hair inherently possesses and are also excellent in storage stability.

[Designation of Document] Abstract

[Abstract]

[Problem] To provide a hair cosmetic composition which can allow a protecting base incorporated therein to penetrate into hair sufficiently and is therefore excellent in effects of preventing or repairing hair damage.

[Means for Resolution] A hair cosmetic composition containing (A) an amphipathic amide lipid, (B) a cationic surfactant, and (C) a silicone and having a pH of from 1 to 4.5 when diluted with water to 20 times the weight of the composition.

[Selected Drawing] None